

# A review of *Piasites* Seyrig (Hymenoptera, Ichneumonidae, Cryptinae), with description of seven new species

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## Abstract

The taxonomic limits of the Malagasy genus *Piasites* Seyrig are reviewed. The genus is redescribed and compared to other similar taxa, especially the Afrotropical *Bozakites* Seyrig. The type species, *P. carinatus* Seyrig, is redescribed; its extensive colour variation is described and discussed. Seven new species are described and illustrated: *P. lineatus*, *P. nigricollis*, *P. orbitalis*, *P. perinetensis*, *P. politus*, *P. quasimodus* and *P. seyrigi*. An identification key to the species is presented.

## Keywords

Ceratocryptina, Cryptini, Darwin wasp, Madagascar, parasitoids, species key

## Introduction

*Piasites* Seyrig (Hymenoptera, Ichneumonidae, Cryptinae) was described in 1952 as part of a large monograph on the ichneumonid fauna of Madagascar. Among the characters used to key the genus out from other cryptine taxa, Seyrig (1952) listed the occiput concave and smooth behind the ocelli, postpetiole weakly convex, posterior transverse carina straight between apophyses, and areolet subquadrate. A single species was described, *P. carinatus* Seyrig.

Townes (1970) provided a redescription of the genus, listing among its diagnostic character states the postpetiole with dorso-lateral carina, hind wing vein M+Cu distinctly arched, notaulus weakly impressed and areolet open at apex. *Piasites* was placed in the subtribe Ceratocryptina, a heterogeneous assemblage of taxa mostly distributed through the Old-World tropics.

The most recent and extensive phylogenetic analyses for Cryptinae (Santos 2017) showed little support for Townes' subtribal classification, with the genera comprising "Ceratocryptina" scattered across the cryptine tree. That work suggested the abandonment of the subtribal classification in favor of informal, but monophyletic, genus groups. Two species of *Piasites* were included in those analyses, the type species *P. carinatus* and an undescribed species. The two taxa were recovered as a monophyletic group inside of the "*Ischnus* group", in a subclade including mostly small-bodied cryptines with a round and short propodeum and moderately short ovipositor, such as *Bozakites* Seyrig, *Coesula* Cameron, *Glabridorsum* Townes and *Ischnus* Gravenhorst. This general phylogenetic placement was later confirmed in the phylogenomic datasets of Santos et al. (2019) and Supeleto et al. (2020), albeit with a smaller taxon sampling.

When examining the Seyrig material deposited at the Muséum National d'Histoire Naturelle, we found several specimens of *Piasites* already sorted into morphospecies by Seyrig. The goal of this study is to provide a taxonomic review of the genus based on those specimens, updating the taxonomic limits of *Piasites*, describing the new species and providing new distribution records.

## Material and methods

This work is based on specimens deposited at the Muséum National d'Histoire Naturelle (Paris, France, **MNHN**), previously identified and sorted by André Seyrig. Morphological terminology follows Broad et al. (2018), with surface microsculpture descriptions based on Eady (1968). The first and subsequent flagellomeres are referred to as f1, f2, f3, etc.; the first and subsequent metasomal tergites are referred to as T1, T2, T3, etc. Measurement ratios were rounded to the nearest 0.05, to reflect a realistic degree of precision. Extended focus photographs were taken using a Canon EOS 6D digital camera with a Canon MP-E 65 mm Macro f/2.8 lens attached to a semi-automatic Cognisys Rail macro Stack Shot system controlled by Helicon Remote and combined using Helicon Focus 6. Distribution maps for species of *Piasites* were made with the online open tool SimpleMapper (Shorthouse 2010).

## Results

### *Piasites* Seyrig, 1952

Figs 1–15

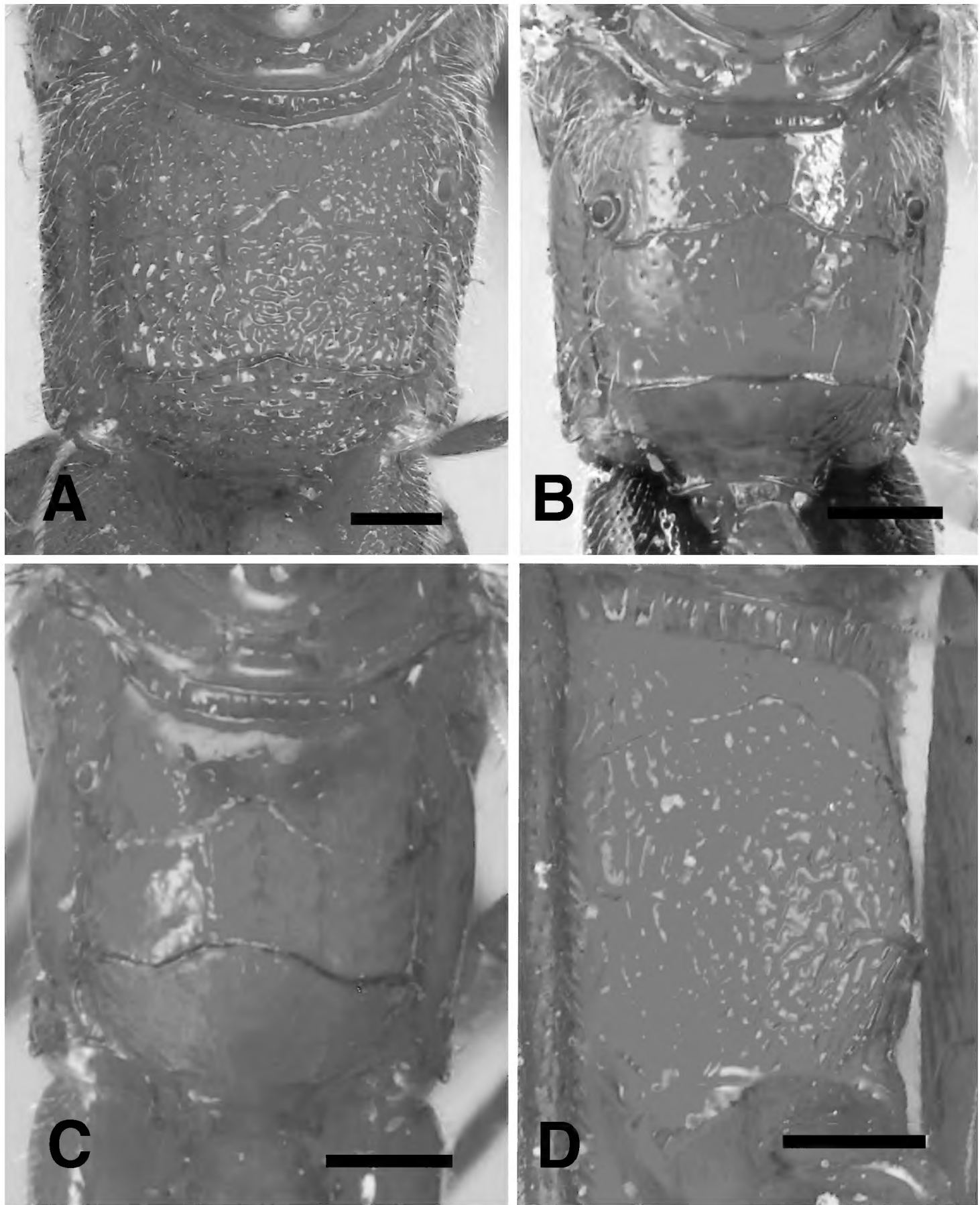
*Piasites* Seyrig, 1952: 191. Type species: *Piasites carinatus* Seyrig, by original designation.

**Diagnosis.** Frons smooth and shiny, without horns or carinae; occipital carina joining hypostomal carina close to or at base of mandible; posterior margin of metanotum without teeth-like projections; transverse furrow at base of propodeum with distinct longitudinal striae; areolet small to medium-sized, open (crossvein 3rs-m absent); T1 with distinct anterolateral tooth.

**Description. Female.** Fore wing 4.0–8.1 mm long. Body moderately slender, shiny and variously sculptured.

**Head.** Frons and vertex smooth and shiny, frons with a median vertical line. Occiput sharply inclined; posterior surface of head almost vertical, somewhat concave, starting almost immediately posteriorly to lateral ocelli. Occipital carina sharp, complete dorsally except in *P. quasimodus*, meeting hypostomal carina close to or at base of mandible. Temple and gena in lateral view moderately wide, ventrally distinctly wider than on dorsal 0.2. Clypeus 1.6–1.9× as broad as medially long, dorsally distinctly convex, ventral margin slightly rounded or somewhat truncate, medially with or without a weak denticle. Labrum conspicuously exposed with long setae on apical margin. Antenna with 23–32 flagellomeres; subapical flagellomeres gradually thicker than basal ones, flattened ventrally. Tip of apical flagellomere rounded, without distinct cluster of modified setae. Malar space moderately long, 0.5–0.8× as long as basal mandibular width, granulate. Mandible moderately short, 1.35–1.65× as long as basal width, dorsal tooth slightly to distinctly longer than ventral one.

**Mesosoma.** Pronotum variously sculptured but always with distinct longitudinal striae; dorsal margin sometimes slightly swollen near dorsal end of epomia; epomia short but strong except in some specimens of *P. carinatus*. Mesoscutum subcircular to ovoid, 1.05–1.25× as long as wide; notaulus reaching past half of mesoscutum length, variously impressed. Epicnemial carina reaching at least 0.5 of distance to subtegular ridge. Sternaulus deep, reaching posterior rim of mesopleuron. Posterior transverse carina of mesosternum represented by a short median ridge, approximately v-shaped. Posterior margin of metanotum without distinct teeth-like projections. Transverse furrow at base of propodeum moderately wide and deep, with distinct longitudinal striae. Pleural carina distinct. Submetapleural carina forming a conspicuous, blunt, subtriangular elevation joining juxtacoxal carina. Fore tibia slightly swollen. Fourth tarsomeres distinctly bilobed, lateral lobes much longer than mesal ones. Propodeum moderately small and more or less evenly rounded in lateral view, in dorsal view about as long as wide; anterior margin medially concave; spiracle circular or elliptic. Longitudinal carinae of propodeum absent, except pleural carina. Anterior transverse carina complete and strong but sometimes almost obscured by strong propodeal sculpture. Posterior transverse carina usually complete, except interrupted medially in *P. perinetensis* and



**Figure 1.** Propodeum of *Piasites*, dorsal view, females (I): **A** *P. carinatus* Seyrig **B** *P. quasimodus* sp. nov. (paratype) **C** *P. politus* sp. nov. (paratype) **D** *P. perinetensis* sp. nov. (holotype). Scale bars: 0.3 mm.

*P. orbitalis*. Wings hyaline; ramulus absent; cross-vein 1cu-a arising opposite M&RS or basad by up to 0.3× of its length; second abscissa of vein CU slightly shorter than cross-vein 2cu-a; cross-vein 2m-cu inclivous and usually slightly curved, its bulla moderately short, occupying less than 0.3× of its length; areolet small to medium sized (in most species 0.45–0.90× as long as abscissa of vein 2m-cu above bulla, up to 1.7× in *P. quasimodus*); cross-vein 3rs-m absent. Hind wing vein M+CU apically strongly arched; vein



cu-a distinctly shorter than first abscissa of vein CU; second abscissa of CU distinct but not reaching wing margin, its apical 0.5 approximately straight; second abscissa of AA (Townes' "brachiella") distinct, except in some specimens of *P. quasimodus*.

**Metasoma.** T1 moderately short, 2.00–2.85× as long as posteriorly broad; petiole in cross-section approximately cylindric, with weak anterolateral tooth; median dorsal and ventro-lateral carinae absent; dorso-lateral carina at least partially distinct. Posterior apex of sternite I opposite spiracle. Thyridium wider than long. T7–8 as long as T5–6. Ovipositor sheath 0.4–0.7× as long as hind tibia (in most species 0.5–0.6×); ovipositor straight, compressed, apex moderately pointed, with distinct nodus and notch; dorsal valve without ridges or teeth; ventral valve with numerous oblique ridges or teeth (10–12), not expanded as a lobe.

**Male.** Generally similar to respective females. Morphological secondary sexual differences are usually more or less uniform within Cryptini and apply to males of *Piasites* as follows. General body size usually smaller than in female. Antenna with 24–31 flagellomeres, from fl3(17) to apex flattened ventrally, each flagellomere shorter than in female; white band of flagellum starting more apically. Transverse furrow at base of propodeum medially longer and shallower than in female. Propodeum with sculpture distinctly coarser than in female. Fore tibia not swollen. T1 slenderer and less widened posteriorly than in female.

**Remarks.** The examination of multiple specimens of *P. carinatus* as well as of additional species of *Piasites* resulted in a redefinition that is at odds with some of the characters described by Townes (1970) for the genus. For instance, Townes stated that *Piasites* has the epomia "indistinct or absent", but the epomia is distinct and strong in most of the new species, and even specimens of *P. carinatus* often have a distinct epomia (Fig. 4), though it is sometimes obscured by the pronotum sculpture. Townes also noted in the key to the genera of Ceratocryptina (couplet 14) that in *Piasites* the notaulus is "not sharp", though most species of the genus have a distinct and deeply impressed notaulus. Another potential problem in determining the genus from Townes' key arises at couplet 6, in which the state "brachiella vein present, reaching at least half the distance to wing margin" leads to the portion of the key containing *Piasites*. However, some specimens of *P. quasimodus* have the hind wing vein 2-1A ("brachiella") very short or indistinct, which would lead users to the wrong couplet.

Compared to other cryptine genera, *Piasites* is most similar to closely related taxa in the *Ischnus* clade; in particular, species of *Piasites* can be mistaken for *Bozakites*, a large Afrotropical genus that occurs both in continental Africa and in Madagascar. *Piasites* can be separated from *Bozakites* by the lack of a tooth-like widening on posterior margin of the metanotum (present in *Bozakites*, just laterad of each side of postscutellum); frons smooth and shiny (vs. granulate, matte and often with weak punctures); occipital carina joining hypostomal carina close to or at base of mandible (vs. joining hypostomal carina far from mandible base); and anterior margin of pronotum not bordered posteriorly by a carina (vs. bordered by a strong carina). The two genera also appear as reciprocally monophyletic in the analyses of Santos (2017), further reinforcing that they represent distinct taxonomic entities. It should be noted, however, that *Bozakites* is a large and variable genus; further phylogenetic analyses including more species of both genera are needed in order to discard the possibility that *Piasites* is nested within *Bozakites*.

While herein we increase the number of known *Piasites* species from one to eight, the genus certainly includes further species. The undescribed species included in the analyses of Santos (2017) does not closely match any of the species treated here, but it was not described in this work because it is represented by a single specimen that was damaged for DNA extraction. Close examination of the extensive Malagasy material collected in multiple expeditions by the California Academy of Sciences (Fisher 2005) may reveal multiple additional species, but we chose to present the information that is readily available in order to advance the knowledge of the Malagasy fauna.

**Biology.** Unknown.

**Distribution.** Endemic to Madagascar. Extensive material from continental Africa was examined, and no specimens corresponding to the taxonomic delimitation of *Piasites* were found.

## Key to the species of *Piasites*

### Females

- 1 Mesoscutum coarsely and densely punctate (Fig. 3C, D) ... *P. carinatus* Seyrig
- Mesoscutum smooth or finely punctate (e.g. Figs 6D, 7C) ..... 2
- 2 Mid lobe of mesoscutum strongly prominent (Fig. 10C, D); occipital carina dorsally absent (Fig. 10D); areolet 1.55–1.7× as high as abscissa of vein 2m-cu above the bulla (Fig. 10E) ..... *P. quasimodus* sp. nov.
- Mid lobe of mesoscutum evenly convex (e.g. Figs 7D, 8D); occipital carina complete (e.g. Figs 7C, 11D); areolet equal to or smaller than section of vein 2m-cu above bulla (e.g. Figs 7E, 9E) ..... 3
- 3 Propodeum from smooth to very shallowly rugulose granulate (Figs 1C, 9B) ..... *P. politus* sp. nov.
- Propodeum conspicuously rugose (Figs 1D, 2) ..... 4
- 4 Posterior transverse carina of propodeum very weak, not forming conspicuous sublateral crests, merging in the central part with the strong wrinkles of the propodeum (Fig. 1D) ..... *P. perinetensis* sp. nov.
- Posterior transverse carina of propodeum strong and usually complete, forming two lateral crests (Fig. 2) ..... 5
- 5 Mesopleuron predominantly smooth, finely punctate anteriorly (Fig. 6C); mid lobe of mesoscutum black (Fig. 6D); T3 orange (Fig. 6E) ..... *P. nigricollis* sp. nov.
- Mesopleuron strongly sculptured (e.g. Figs 5C, 7D); mid lobe of mesoscutum orange or dark orange (Figs 5D, 7C, 11D); T3 brownish black to black (Figs 5E, 7A, 11A) ..... 6
- 6 Coxae entirely orange (Fig. 7A); juxtacoxal carina only present anteriorly, replaced posteriorly by mesopleural rugosities (Fig. 7D) ..... *P. orbitalis* sp. nov.
- Front and mid coxae white, hind coxa black and white (Figs 5A, 11A); juxtacoxal carina strong and usually complete (Figs 5C, 11C) ..... 7

- 7 Mesopleuron densely strigose punctate; metapleuron transversely finely rugulose (Fig. 5C); hind coxa with a fine longitudinal yellow cream stripe at base (Fig. 5E, arrow); T1 orange, T2 dark orange to brownish black (Fig. 5E)..... ***P. lineatus* sp. nov.**
- Mesopleuron finely longitudinally striate on a smooth background; metapleuron with coarse transverse striae on a rugulose background (Fig. 11C); hind coxa without longitudinal yellow cream stripe at base; T1 black, T2 white (Fig. 11A)..... ***P. seyrigi* sp. nov.**

## Males

Males of *P. lineatus*, *P. orbitalis* and *P. politus* are unknown.

- 1 Mesoscutum coarsely and densely punctate (Fig. 13A).... ***P. carinatus* Seyrig**
- Mesoscutum smooth or finely punctate (Fig. 13B–E) ..... **2**
- 2 Mid lobe of mesoscutum strongly prominent (as in Fig. 10C, D); occipital carina dorsally absent; areolet pentagonal, 1.3× as high as abscissa of vein 2m-cu above bulla (Fig. 12B); pronotum with coarse complete striae parallel to dorsal margin (Fig. 13B) ..... ***P. quasimodus* sp. nov.**
- Mid lobe of mesoscutum evenly convex (Fig. 12C–E); occipital carina complete; areolet at most 0.7× as high as abscissa of vein 2m-cu above bulla; pronotum dorsally strigose or punctate (Fig. 13C–E)..... **3**
- 3 Front and mid coxa yellow cream, hind coxa black and yellow cream; T1 and T3 black, T2 yellow cream (Fig. 12C) ..... ***P. seyrigi* sp. nov.**
- Coxae and T1–T3 orange (Fig. 12D, E) ..... **4**
- 4 Metapleuron smooth or shallowly rugulose punctate. (Fig. 13F); propleuron, anterior part of pronotum and mesoscutum brownish black (Fig. 13D); ocular orbits completely white cream (Fig. 13D) ..... ***P. nigricollis* sp. nov.**
- Metapleuron finely transversally striate (Fig. 13G); propleuron, pronotum and mesoscutum orange (Fig. 13E); outer ocular orbit extensively black (Fig. 13E) ..... ***P. perinetensis* sp. nov.**

## *Piasites carinatus* Seyrig, 1952

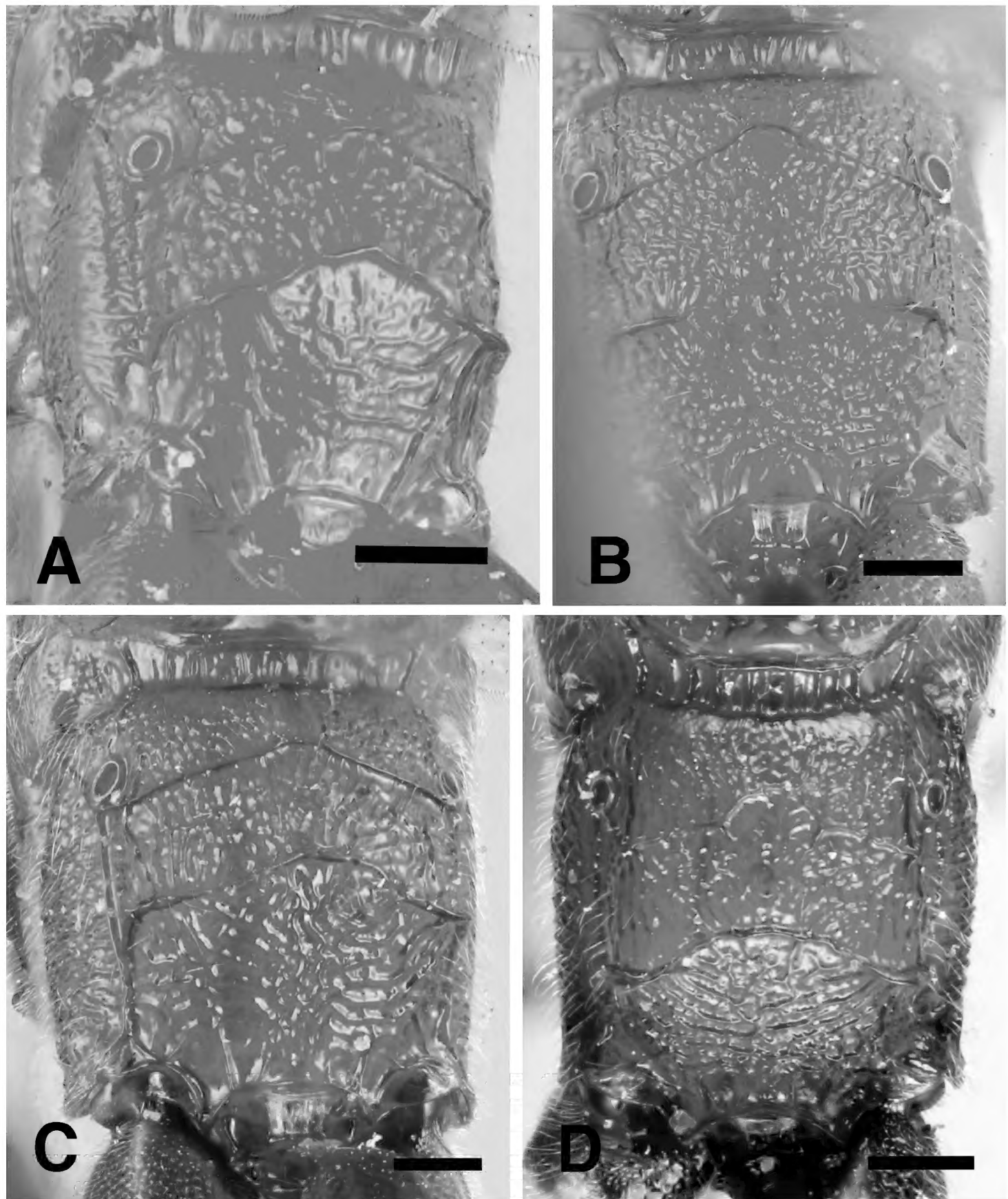
Figs 1A, 3–4, 12A, 13A, 14A

*Piasites carinatus* Seyrig, 1952: 191. Original description, figure. Holotype ♀ (MNHN, examined). Type data: MADAGASCAR, Ivondro (handwritten over a printed label saying “Rogez, Foret Cote Est”), Muséum Paris, XII-38, A. Seyrig. Type databased (EY9406), images available at <https://science.mnhn.fr/institution/mnhn/collection/ey/item/ey9406>.

**Diagnosis.** *Piasites carinatus* can be easily distinguished from all other *Piasites* species by the coarsely and densely punctate mesoscutum (Figs 3C, D, 13A).

**Description. Female.** Fore wing length 6.2–8.1 mm.

**Head.** In dorsal view strongly narrowed behind eyes, 0.50–0.55× as long as wide. Gena in dorsal view rounded, somewhat swollen. Posterior ocellus separated from eye by 1.0–1.3× its maximum diameter. Distance between posterior ocelli 0.80–1.15× their diameter. Occipital carina complete, slightly v-shaped dorsally. Face smooth and shiny, convex, central part delimited by two weak vertical depressions from antennal sockets to clypeal foveae. Clypeal suture absent or weakly present laterally. Clypeus 1.8–1.9×



**Figure 2.** Propodeum of *Piasites*, dorsal view, females (II): **A** *P. nigricollis* sp. nov. (holotype) **B** *P. orbitalis* sp. nov. (holotype) **C** *P. lineatus* sp. nov. (paratype) **D** *P. seyrigi* sp. nov. (paratype). Scale bars: 0.3 mm.



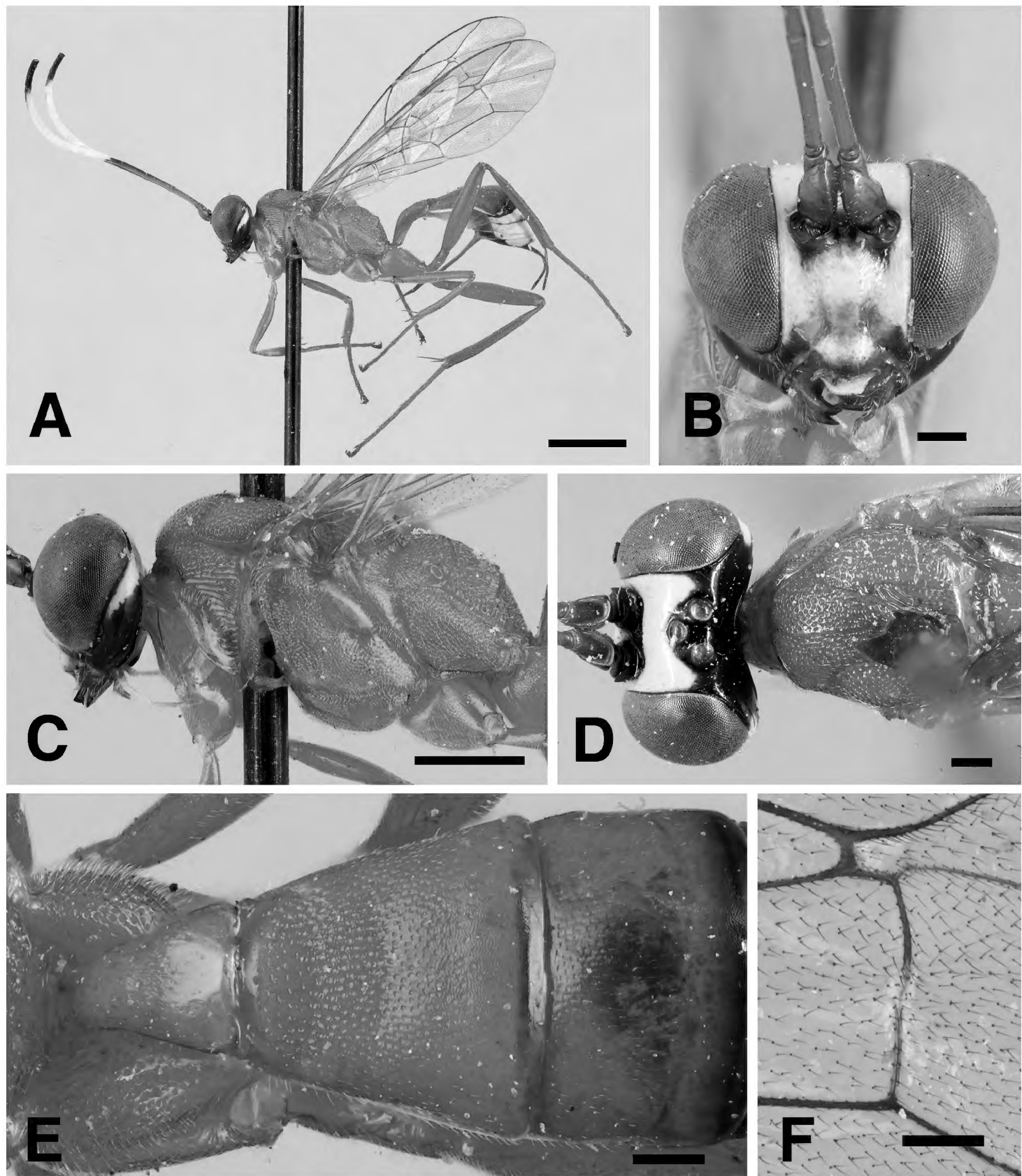
as broad as medially long, very convex, with sparse relatively long setae, prominent in lateral view, ventral margin rounded with a median denticle. Malar space  $0.55\text{--}0.70\times$  as long as basal mandibular width. Mandible  $1.60\times$  as long as basal width; dorsal tooth distinctly longer than ventral one. Antenna with 27–32 flagellomeres, strongly tapered towards apex; flagellomeres from f11(13) to apex, conspicuously flattened ventrally; f1  $7.0\text{--}7.3\times$  as long as its maximum width.

**Mesosoma.** Pronotum coarsely, densely and deeply punctate dorsally, with coarse longitudinal striae in subdorsal lateral part, ventrally tending to smooth; epomia very short or not distinguishable from other striae. Mesoscutum about  $1.25\times$  as long as wide, evenly convex, coarsely, densely and deeply punctate, punctures touching; central part between posterior end of notauli with coarse convergent rugosities or striae; notaulus weak, reaching about 0.5 of length of mesoscutum, merged with coarse sculpture of mesoscutum. Scutellum smooth with very fine inconspicuous punctures, lateral carinae distinct on anterior 0.6. Mesopleuron shiny, with dorsal longitudinal strigosity, densely and coarsely punctate ventally; sternaulus deep and wide, with transverse keels; epicnemial carina weak, reaching upper corner of mesopleuron. Metapleuron shiny, with coarse and deep dense punctures; juxtacoxal and submetapleural carinae strong and complete. Propodeum coarsely and strongly rugose punctate between anterior and posterior transverse carinae, densely punctate anteriorly, coarsely rugose posterior to posterior transverse carina; transverse carinae complete, anterior one centrally angled towards anterior part, posterior one evenly curved centrally, somewhat elevated and forming two low lateral crests. Hind leg with femur  $5.0\text{--}5.8\times$  as long as high. Areolet subrectangular or pentagonal,  $0.7\text{--}0.9\times$  as high as wide, relatively small,  $0.45\text{--}0.6\times$  as high as abscissa of vein 2m-cu above bulla. Hind wing with vein cu-a  $0.4\text{--}0.6\times$  length of first abscissa of CU.

**Metasoma.** T1  $2.0\text{--}2.4\times$  as long as posteriorly broad, weakly strigose longitudinally, in lateral view strongly curved at mid dorsal part, dorso-lateral carina weak but complete. T2  $0.8\text{--}1.0\times$  as long as posteriorly broad, densely punctate anteriorly, finely granulate posteriorly. T3 more weakly punctate, following tergites finely granulate. Ovipositor sheath  $0.55\text{--}0.65\times$  as long as hind tibia.

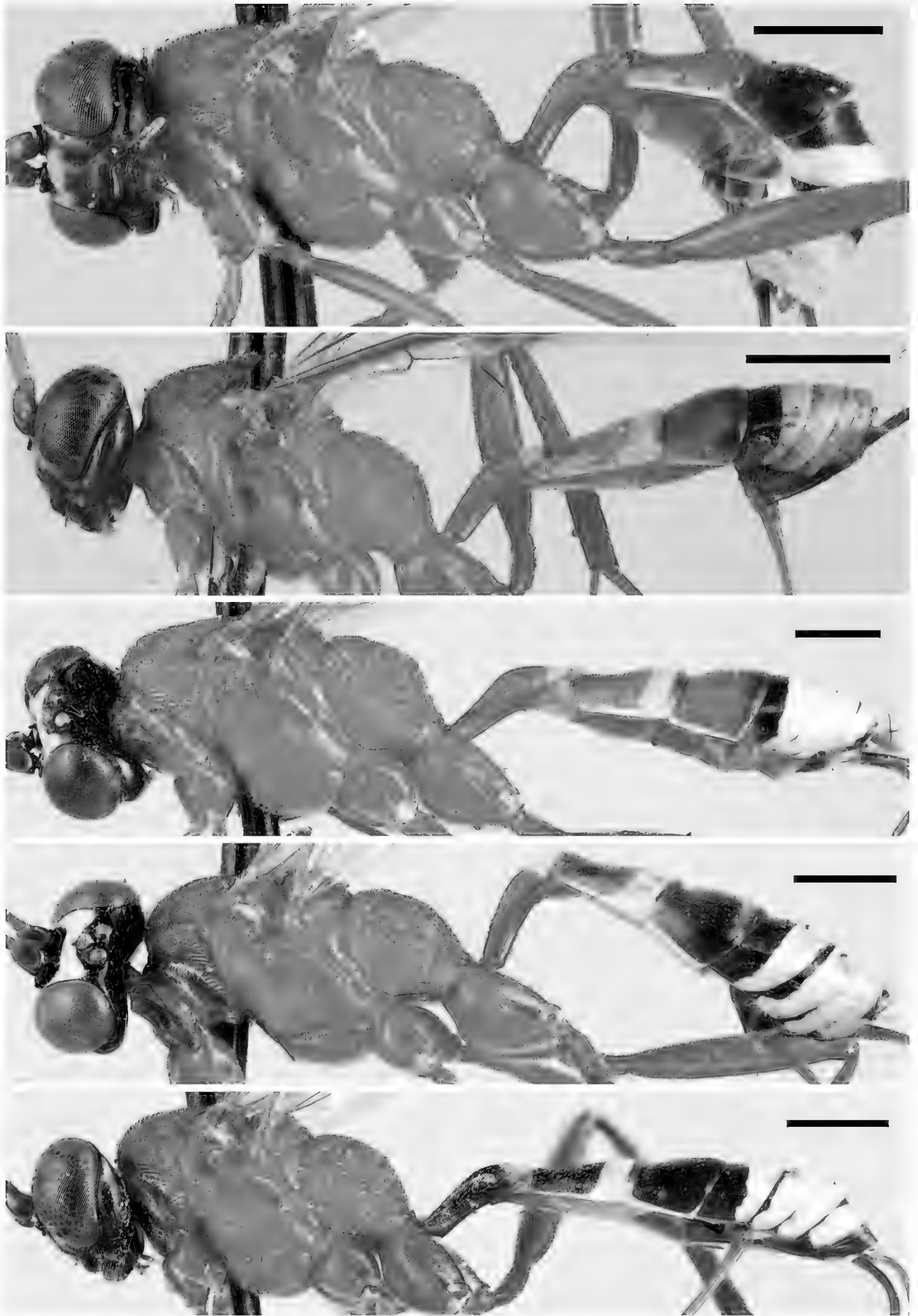
**Colour.** Body mostly orange. Head dark brown or black with face and frons (except periphery of antennal sockets), and usually clypeus partially, labrum and a spot at dorsal part of outer ocular orbit, yellow cream; scape, pedicel and f1–4 orange, distal part of f3(4) to f10(12) white, f10–12 only dorsally, following flagellomeres dark brown. T1 orange to dark brown, with a posterior yellow cream band, sometimes entirely orange; T2 anteriorly orange, posteriorly dark brown or black, with a wide posterior yellow cream band, posterior margin black, sometimes tergite entirely orange; T3 dark orange, dark brown or black; T4–5 anteriorly black, posteriorly white; following tergites similar but usually with the black anterior part hidden by anterior tergite. Legs orange. Wings hyaline, slightly yellowish, pterostigma yellow.

**Male.** Fore wing length 4.0–7.0 mm. **Head.** In dorsal view  $0.5\text{--}0.55\times$  as long as wide. Posterior ocellus separated from eye  $1.0\text{--}1.2\times$  its maximum diameter. Distance between hind ocelli  $1.0\text{--}1.2\times$  maximum diameter of posterior ocellus. Clypeus  $1.65\text{--}1.75\times$  as broad as medially long. Malar space  $0.50\text{--}0.65\times$  as long as basal mandibular



**Figure 3.** *Piasites carinatus* Seyrig, female: **A** habitus, lateral view (holotype) **B** head, front view (holotype) **C** head and mesosoma, lateral view (holotype) **D** head and mesoscutum, dorsal view (holotype) **E** T1–3, dorsal view (paratype) **F** front wing, areolet and vein 2m-cu (paratype). Scale bars: 2 mm (**A**); 1 mm (**C**); 0.3 mm (**B**, **D–F**).

width. Antenna with 24–31 flagellomeres, flagellum not enlarged subapically; flagellomeres from fl7(18) to apex flattened ventrally; fl 5.0–5.25× as long as wide. **Mesosoma.** Hind leg with femur 5.3–5.6× as long as high. Hind wing with vein cu-a 0.15–0.5× length of first abscissa of CU. **Metasoma.** T1 2.3–2.55× as long as posteriorly broad, longitudinally weakly strigose. **Colour.** As female but antenna with white



**Figure 4.** Colour variation of *P. carinatus*: head, mesosoma and metasoma, lateral view, females. Scale bars: 1 mm.

band on f7(8)–15(16); anterior parts of T4 and T5 black, posterior parts of T4–5 and T6–7 entirely white. Other features as in female.

**Variation.** *Piasites carinatus* is a very variable species in colour (Fig. 4). There is a gradient of individuals with a tendency to have progressively darker body colour: on the head, the ventral anterior part becomes brownish reaching the clypeus, malar space and face, as well as the disappearance of the spot at the dorsal part of the outer ocular orbit; the mesosoma can vary from orange to dark orange and on the metasoma there is a tendency for the orange parts of the usual pattern to be darkened, through to becoming brown to black, and also to the appearance of transverse yellow bands at posterior parts of T1 and T2, and more rarely also on T3. Following this variation spectrum, Seyrig had divided the specimens in his collection into (undescribed) subspecies, but we choose not to delimit subspecies in *P. carinatus* due to the continuous nature of the variation, its non-geographic structure (i.e., specimens of different colour morphs are found in the same localities), and to theoretical and practical issues involving the concept of subspecies themselves (Wilson and Brown 1953; Mallet 2017).

**Material examined. Holotype:** MADAGASCAR • ♀; Ivondro; XII-38; A. Seyrig; Muséum Paris EY9406; “*Piasites carinatus* Sey. Type” “Holotypus *Piasites carinatus* ♀ Seyrig 1952, Labeled by T. Yoshida 2011” (MNHN). **Other material.** 83 ♀♀, 42 ♂♂. MADAGASCAR • 10 ♀♀, 1 ♂; Ambohimanga; Museum Paris; XI-36; A Seyrig • 1 ♂; Anjozorobe (Lasen); Museum Paris; XII-36; A Seyrig • 3 ♀♀, 4 ♂♂; Antsirabé; Museum Paris; XI-36; A Seyrig • 1 ♀, 6 ♂♂; Bekily, Reg sud de L’île; Museum Paris; V-36; A. Seyrig • 4 ♂♂; same data as for preceding; VI-36 • 5 ♀♀; same data as for preceding; X-36 • 2 ♀♀; same data as for preceding; XI-36 • 1 ♂; same data as for preceding; II-37 • 1 ♀, 2 ♂♂; same data as for preceding; IV-37 • 1 ♀; same data as for preceding; VI-40 • 1 ♀, 1 ♂; Fianarantsoa, Plateau Central; Museum Paris; XI-35; A Seyrig • 9 ♀♀, 6 ♂♂; same data as for preceding; XI-36 • 1 ♀; same data as for preceding; III-38 • 1 ♀; Fort Dauphin; Museum Paris; VIII-40; A. Seyrig • 1 ♀; Ivondro; Museum Paris; I-39; A. Seyrig • 1 ♀; same data as for preceding; II-40 • 2 ♀♀; same data as for preceding; V-40 • 4 ♀♀; same data as for preceding; VII-40 • 3 ♀♀; Perinet, Forêt Cote Est; Museum Paris; II-39; A Seyrig • 1 ♀; same data as for preceding; II-42 • 12 ♀♀, 2 ♂♂; Ranomafana; Museum Paris; X-38; A. Seyrig • 1 ♀, 1 ♂; same data as for preceding; I-40 • 8 ♀♀, 7 ♂♂; Rogez, Forêt Cote Est; Museum Paris; 1935; A Seyrig • 1 ♂; same data as for preceding; II-36 • 3 ♀♀; same data as for preceding; V-36 • 3 ♀♀, 1 ♂; same data as for preceding; IX-36 • 1 ♀; same data as for preceding; X-36 • 2 ♀♀; same data as for preceding; I-37 • 5 ♀♀, 5 ♂♂; same data as for preceding; II-37 • 1 ♀; same data as for preceding; IV-37 • 1 ♂; same data as for preceding; IV-38 (all them MNHN).

**Remarks.** In addition to the holotype, Seyrig reports having examined 17 females and 40 males. However, he did not provide full label data for the examined specimens, stating they were collected in Rogez and Bekily (Madagascar). These specimens would have paratype status under the ICZN. However, the number of specimens of *P. carinatus* from those localities in the MNHN collection does not match these numbers: there are 10 females and 13 males from Bekily, and 23 females and 15 males from Rogez, for a total of 33 females and 28 males from both localities. Some specimens of *P. carinatus*



in the collection bear handwritten labels by Seyrig, which could indicate they could be some of the originally studied specimen, but not all of those bearing Seyrig labels are from Bekily and Rogez, indicating that they could have been re-examined posteriorly. Hence, it is impossible to know for sure which of the specimens are the paratypes.

***Piasites lineatus* sp. nov.**

<http://zoobank.org/8AD74C5E-E9A0-4C59-917C-1C2D0A8DA1BD>

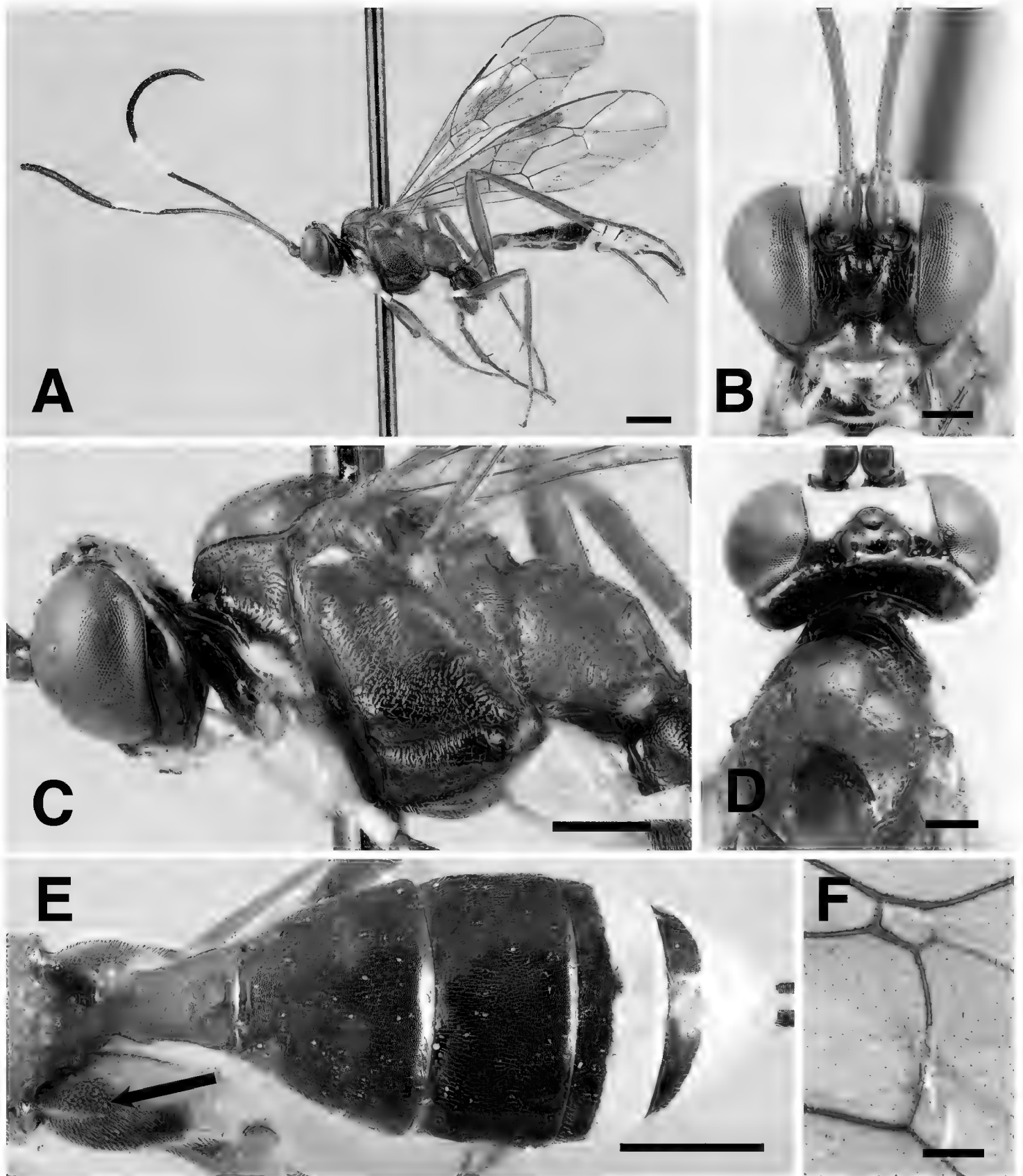
Figs 2C, 5, 14B

**Diagnosis.** *Piasites lineatus* sp. nov. can be distinguished from all other *Piasites* species by the combination of the following characters: mesoscutum evenly convex, with moderately dense punctures on a shallow granulate background (Fig. 5C, D); mesopleuron densely and finely strigose punctate in dorsal part, ventrally finely and densely rugose punctate (Fig. 5C); metapleuron transversely rugulose (Fig. 5C); juxtacoxal carina strong and complete (Fig. 5C); propodeum strongly and coarsely rugose (Fig. 2C); hind coxa black and yellow cream with a fine longitudinal yellow cream stripe at base (Fig. 5E).

**Description. Female.** Fore wing length 6.0–6.5 mm.

**Head.** In dorsal view, strongly narrowed behind eyes, about 0.5× as long as wide. Gena in dorsal view weakly rounded, slightly swollen. Posterior ocellus separated from eye 1.1–1.2× its maximum diameter. Distance between posterior ocelli 1.0× their diameter. Occipital carina complete, evenly curved dorsally. Face convex centrally, convexity delimited by two weak vertical depressions from antennal sockets to clypeal foveae, with relatively dense punctures. Clypeal suture complete. Clypeus 1.6–1.7× as broad as medially long, moderately convex, with relatively long setae in the central part, prominent in lateral view, ventral margin slightly rounded without a median denticle. Malar space about 0.5× as long as basal mandibular width. Mandible 1.50× as long as basal width; dorsal tooth distinctly longer than ventral one. Antenna with 29–32 flagellomeres, strongly tapered towards apex; flagellomeres from fl1 to apex conspicuously flattened ventrally; fl 7.6–7.75× as long as its maximum width.

**Mesosoma.** Pronotum longitudinally strigose punctate, rugose punctate dorsally, becoming smooth ventrally; epomia very strong, straight, crossing the anterior depression of pronotum. Mesoscutum 1.10× as long as wide, evenly convex, with moderately dense punctures on a shallow granulate background; middle part, between posterior end of notauli, strongly rugose; notaulus deep, reaching about 0.7 of length of mesoscutum, without transverse keels. Scutellum coarsely rugose punctate, lateral carinae strong, reaching 0.6 of its anterior length. Mesopleuron densely and finely strigose punctate in dorsal part, ventrally finely and densely rugose punctate; sternaulus deep and wide, without transverse carinae; epicnemial carina very weak, reaching the subtegular ridge. Metapleuron transversely strigose punctate; juxtacoxal and submetapleural carinae strong and complete. Propodeum strongly and coarsely rugose; anterior transverse carina complete, centrally angled towards anterior part; posterior transverse



**Figure 5.** *Piasites lineatus* sp. nov., female: **A** habitus, lateral view (holotype) **B** head, front view (holotype) **C** head and mesosoma, lateral view (holotype) **D** head and mesoscutum, dorsal view (holotype) **E** metasoma, dorsal view, arrow shows yellow cream dorsal stripe on hind coxa (paratype) **F** front wing, areolet and vein 2m-cu (paratype). Scale bars: 1 mm (**A**, **E**); 0.5 mm (**C**); 0.3 mm (**B**, **D**, **F**).

carina strong and complete evenly curved medially, forming low lateral crests. Hind leg with femur about  $5.7\times$  as long as deep. Areolet pentagonal,  $0.6\text{--}0.65\times$  as high as wide, relatively small, about  $0.5\times$  as high as abscissa of vein 2m-cu above bulla. Hind wing with vein cu-a about  $0.5\times$  length of first abscissa of CU.

**Metasoma.** T1  $2.7\text{--}2.85\times$  as long as posteriorly broad, granulate, weakly curved dorsally in lateral view, dorso-lateral carina weak, present anteriorly and posteriorly.

T2 0.75–0.8× as long as posteriorly broad, finely granulate as the following tergites. Ovipositor sheath about 0.5× as long as hind tibia.

**Colour.** Body mostly orange. Head brownish black with facial orbits, frons (except periphery of antennal sockets), outer ocular orbits, malar space, clypeus, labrum, mandible except teeth, and palpi, yellow cream; scape, pedicel and f1–3 orange, following flagellomeres dark brown, f5–9 white dorsally. Mesosoma with a yellow cream spot on ventral corner of pronotum; subtegular ridge and hind corner of metapleuron, propleuron, anterior part of pronotum and ventral part of mesothorax, black. Legs with anterior and mid coxae and trochanters yellow cream, hind coxa black with inner part and apex, and a longitudinal dorsal narrow stripe at base, trochanter and base of trochantellus, yellow cream; distal part of trochantellus black; all tarsi infusate. T2 dark orange anteriorly, brownish black posteriorly; T3, anterior part of T4 and T5 black, posterior part of T4, T5 and following tergites yellow cream. Wings hyaline, slightly yellowish, pterostigma brown.

**Male.** Unknown.

**Etymology.** From the Latin *linea*, meaning “line”, in reference to the whitish longitudinal stripe on the hind coxa.

**Material examined.** 2 ♀♀. **Holotype:** MADAGASCAR • ♀; Ambositra; Museum Paris; XI-36; A. Seyrig; MNHN. **Paratypes:** MADAGASCAR • 1 ♀; Fianarantsoa, Plateau Central; XI-36; A. Seyrig; MNHN.

***Piasites nigricollis* sp. nov.**

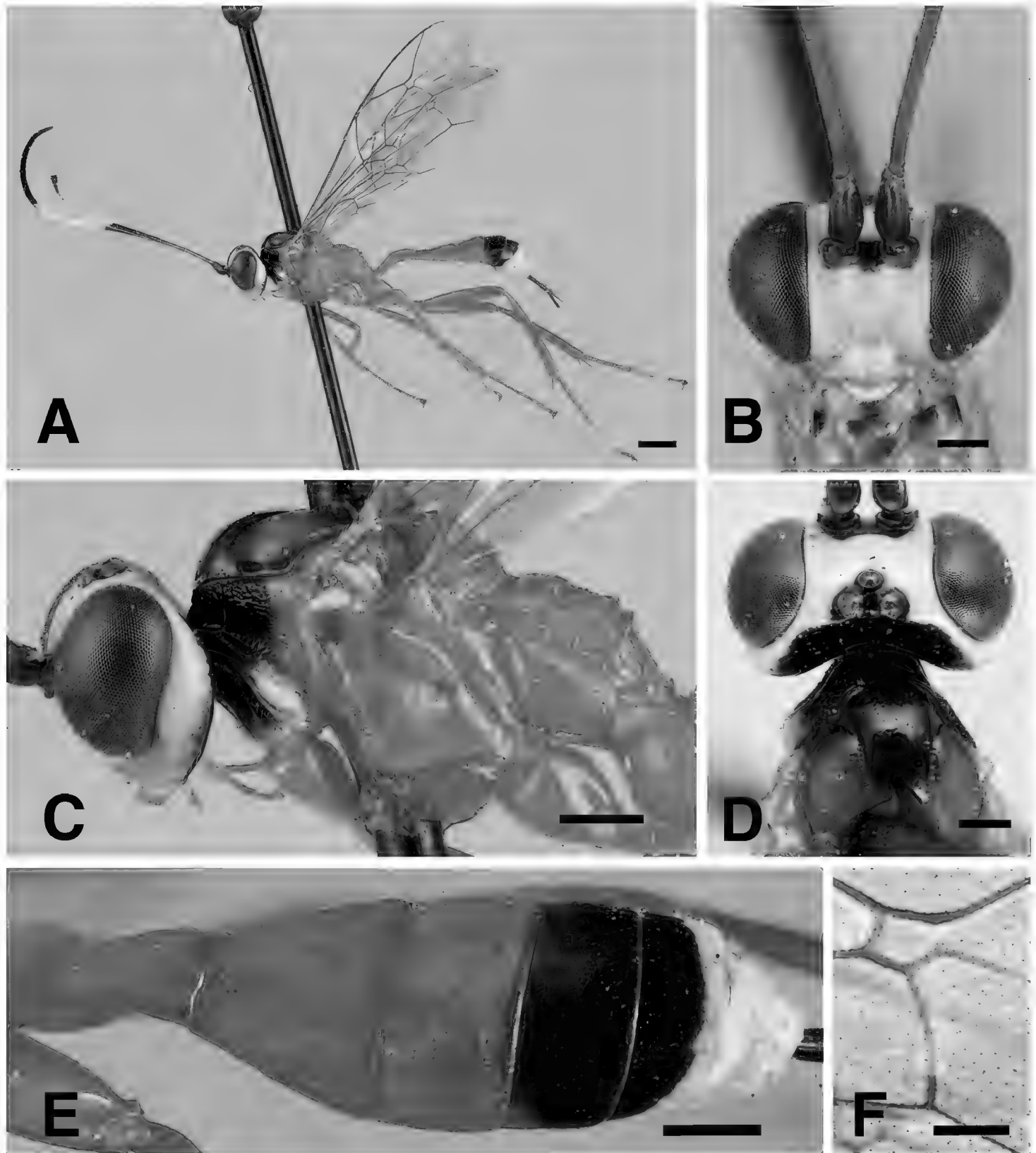
<http://zoobank.org/623E4B24-7B9D-4B64-9907-325576744831>

Figs 2A, 6, 12E, 13D, F 14C

**Diagnosis.** *Piasites nigricollis* sp. nov. can be distinguished from all other *Piasites* species by the combination of the following characters: pronotum shallowly and longitudinally strigose, ventrally smooth (Figs 6C, 13D); mesoscutum evenly convex, mostly smooth and shiny with fine punctures on median lobe (Figs 6C, D, 13D); mesopleuron mostly smooth and shiny, shallowly rugulose punctate at dorsal anterior corner, ventral anterior part shallowly punctate (Figs 6C, 13D); propodeum strongly rugose punctate (Figs 2A, 13D); propleuron, anterior part of pronotum and mesoscutum brownish black, ocular orbits completely white cream (Figs 6C, D, 13D). Additionally, male with metapleuron smooth to shallowly rugulose punctate (Fig. 13F).

**Description. Female.** Fore wing length about 6.8 mm.

**Head.** In dorsal view, moderately narrowed behind eyes, about 0.55× as long as wide. Gena in dorsal view rounded, weakly swollen. Posterior ocellus separated from eye about 1.55× its maximum diameter. Distance between posterior ocelli 1.1× their diameter. Occipital carina complete, evenly curved dorsally. Face smooth and shiny, slightly convex in the central part with very fine setiferous punctures. Clypeal suture weak, only present laterally. Clypeus about 1.6× as broad as medially long, very convex with relatively long setae in the central part, prominent in lateral view, ventral margin rounded, with a very weak median denticle. Malar space about 0.8× as long as



**Figure 6.** *Piasites nigricollis* sp. nov., female (holotype): **A** habitus, lateral view **B** head, front view **C** head and mesosoma, lateral view **D** head and mesoscutum, dorsal view **E** metasoma, dorsal view **F** front wing, areolet and vein 2m-cu. Scale bars: 1 mm (**A**); 0.5 mm (**C**, **E**); 0.3 mm (**B**, **D**, **F**).

basal mandibular width. Mandible  $1.60\times$  as long as basal width; dorsal tooth distinctly longer than ventral one. Antenna with 28 flagellomeres, strongly tapered towards apex; flagellomeres from fl 1 to apex conspicuously flattened ventrally; fl about  $8.6\times$  as long as its maximum width.

**Mesosoma.** Pronotum shallow and longitudinally strigose, ventrally becoming smooth; epomia strong and relatively long, straight, crossing the anterior depression of pronotum. Mesoscutum  $1.05\times$  as long as wide, evenly convex, predominantly



smooth and shiny, with fine and dense setiferous punctures on median lobe, lateral parts smooth; notaulus deep and narrow, with very small and inconspicuous transverse keels. Scutellum rugulose anteriorly, smooth posteriorly, lateral carinae strong, reaching 0.7 its anterior length. Mesopleuron predominantly smooth and shiny, shallowly rugulose punctate at dorsal anterior corner, ventral anterior part shallowly punctate; sternaulus deep, with very small transverse keels; epicnemial carina very weak, reaching the subtegular ridge. Metapleuron shallowly transverse strigose punctate; juxtacoxal and submetapleural carinae strong and complete. Propodeum strongly rugose punctate; anterior and posterior transverse carinae complete, centrally angled towards anterior part, parallel; posterior transverse carina forming two low lateral crests. Hind leg with femur about  $6.1\times$  as long as high. Areolet pentagonal, about  $0.7\times$  as high as wide, relatively small,  $0.7\times$  as high as abscissa of vein 2m-cu above bulla. Hind wing with vein cu-a about  $0.5\times$  length of first abscissa of CU.

**Metasoma.** T1 about  $2.45\times$  as long as posteriorly broad, granulate, strongly curved dorsally in lateral view, dorso-lateral carina very weak, only present at postpetiole. T2 about  $0.85\times$  as long as posteriorly broad, finely granulate as the following tergites. Ovipositor sheath about  $0.55\times$  as long as hind tibia.

**Colour.** Body mostly orange. Head yellow cream; mandibular teeth, ocellar triangle and central part of occiput, scape and pedicel brownish black; f1–3 orange, following flagellomeres dark brown, f5–10 white. Mesosoma with propleuron, dorso-lateral part of pronotum and anterior part of mesoscutum, brownish black; subventral spot on pronotum and subtegular ridge yellow cream. T4 dorsally, and anterior part of T5 and T6, black; posterior part of tergites T5 and T6 and following tergites yellow cream. Wings hyaline, slightly yellowish, pterostigma yellow.

**Male.** Fore wing length about 7.7 mm. **Head.** Posterior ocellus separated from eye about  $1.45\times$  its maximum diameter. Distance between hind ocelli about  $1.15\times$  maximum diameter of posterior ocellus. Clypeus about  $1.65\times$  as broad as medially long. Malar space about  $0.7\times$  as long as basal mandibular width. Antenna with at least 24 flagellomeres, flagellum not enlarged subapically; flagellomeres from f17 to apex flattened ventrally; f1 about  $6.0\times$  long as its maximum width. **Mesosoma.** Scutellum anteriorly punctate. Metapleuron shallowly rugulose punctate. Posterior transverse carina of propodeum evenly curved centrally. Hind leg with femur about  $5.45\times$  as long as high. Areolet about  $0.7\times$  as high as wide,  $0.75\times$  as high as abscissa of vein 2m-cu above bulla. Hind wing with vein cu-a  $0.55\times$  as long as first abscissa of CU. **Metasoma.** T1 about  $3.2\times$  as long as posteriorly broad. T2 about  $1.2\times$  as long as posteriorly broad. **Colour.** As in female, but antenna with white band from apex of f7 to f15. Other features as in female.

**Etymology.** From the Latin *collum*, meaning “neck”, in reference to the black-coloured pronotum and anterior part of mesoscutum.

**Material examined.** 1 ♀ 1 ♂. **Holotype:** MADAGASCAR • ♀; Ivondro; Museum Paris; VII-40; A Seyrig; MNHN. **Paratype:** MADAGASCAR • 1 ♂; same collection data as for holotype; VIII-40; MNHN.

***Piasites orbitalis* sp. nov.**

<http://zoobank.org/B2A5866F-D202-4D35-9126-33DAF22BB73B>

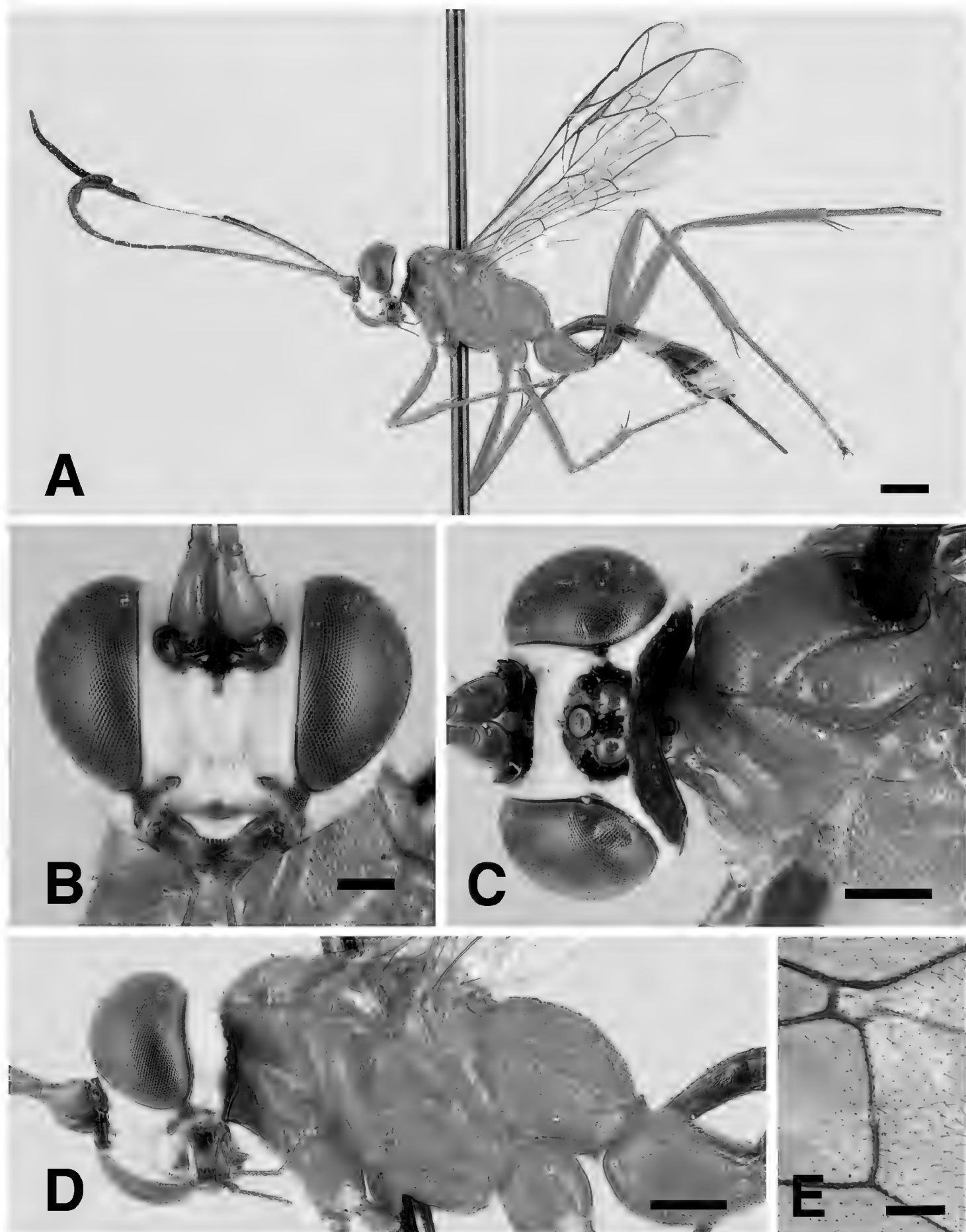
Figs 2B, 7, 14D

**Diagnosis.** *Piasites orbitalis* sp. nov. can be distinguished from all other *Piasites* species by the combination of the following characters: mesoscutum evenly convex, mostly smooth and shiny (Fig. 7C); mesopleuron dorsally rugose punctate, medially strigose punctate and ventrally coarsely punctate (Fig. 7D); metapleuron entirely rugose punctate (Fig. 7D); juxtacoxal carina only present on the anterior part (Fig. 7D); propodeum strongly rugose; posterior transverse carina weak, forming very low lateral crests, merging in the central part with the strong rugosities of the propodeum (Fig. 2B); areolet 0.45–0.5× as high as abscissa of vein 2m-cu above bulla (Fig. 7E); coxae entirely orange (Fig. 7A, D); T3 black (Fig. 7A).

**Description. Female.** Fore wing length 7.2–8.0 mm.

**Head.** In dorsal view, strongly narrowed behind eyes 0.50–0.55× as long as wide. Gena in dorsal view rounded, weakly swollen. Posterior ocellus separated from eye 1.25–1.40× its maximum diameter. Distance between posterior ocelli 1.0× their diameter. Occipital carina complete, weakly v-shaped dorsally. Face slightly convex, mostly smooth and shiny, with sparse punctures and some rugosities in the central part below antennal sockets, middle part delimited by two weak vertical depressions from antennal sockets to clypeal foveae. Clypeal suture present laterally. Clypeus 1.80–1.85× as broad as medially long, very convex, with relatively long setae in the central part, conspicuously prominent in lateral view, ventral margin slightly rounded with a weak median denticle. Malar space 0.60–0.65× as long as basal mandibular width. Mandible 1.35× as long as basal width; dorsal tooth only slightly longer than ventral one. Antenna with 31 flagellomeres, strongly tapered towards apex; flagellomeres from fl1 to apex conspicuously flattened ventrally; fl 8.0–8.5× as long as its maximum width.

**Mesosoma.** Pronotum mostly strigose punctate, dorsally rugose punctate; epomia weak and short, reaching just the anterior depression of pronotum. Mesoscutum 1.20× as long as wide, evenly convex, predominantly smooth and shiny, with very fine and dense setiferous punctures on median lobe, lateral parts smooth; middle part between posterior end of notaulus strongly rugose; notaulus deep, reaching about 0.7 length of mesoscutum, without transverse keels. Scutellum rugose anteriorly, smooth posteriorly, lateral carinae strong, reaching 0.7 its anterior length. Mesopleuron dorsally rugose punctate, medially strigose punctate and ventrally coarsely punctate; sternaulus deep, with very small transverse keels; epicnemial carina relatively strong, reaching the subtegular ridge. Metapleuron entirely rugose punctate; juxtacoxal carina only scarcely present on the anterior part; submetapleural carina strong and complete. Propodeum strongly rugose; anterior transverse carina complete, centrally narrowly curved towards anterior part; posterior transverse carina weak, forming very low lateral crests, merging in the central part with the strong rugosities of the propodeum. Hind leg with femur about 6.0× as long as deep. Areolet pentagonal, about 0.7× as high as wide, relatively small, 0.45–0.5× as high as abscissa of vein 2m-cu above bulla. Hind wing with vein cu-a 0.4–0.45× length of first abscissa of CU.



**Figure 7.** *Piasites orbitalis* sp. nov., female: **A** habitus, lateral view (holotype) **B** head, front view (holotype) **C** head and mesoscutum, dorso-lateral view (holotype) **D** head and mesosoma, lateral view (holotype) **E** front wing, areolet and vein 2m-cu (paratype). Scale bars: 1 mm (**A**); 0.5 mm (**C, D**); 0.3 mm (**B, E**).

**Metasoma.** T1 2.1–2.2× as long as posteriorly broad, granulate, weakly curved dorsally in lateral view, dorso-lateral carina very weak but complete. T2 about 0.8× as long as posteriorly broad, finely granulate as the following tergites. Ovipositor sheath about 0.55× as long as hind tibia.

**Colour.** Body mostly orange. Head black with face and frons except periphery of antennal sockets, ocular orbits (sometimes except an interruption on vertex and malar space), clypeus and labrum, yellow cream; mandible and palpi dark brown; scape, pedicel and f1–3 dark orange, following flagellomeres dark brown, f5–9(10) white. Legs mostly dark orange, all coxae orange. T1 dark orange, anterior half of T2, T3, and anterior part of T4 black; posterior part of T2 and T4 and T5–8 yellow cream. Wings hyaline, slightly yellowish, pterostigma light brown.

**Male.** Unknown.

**Etymology.** The name is a reference to the yellow cream ocular orbits.

**Material examined.** 2 ♀♀. **Holotype:** MADAGASCAR • ♀; Rogez, Foret Cote Est; Museum Paris; X-36; A Seyrig; MNHN. **Paratype:** MADAGASCAR • 1 ♀; same collection data as for holotype; 1935; MNHN.

***Piasites perinetensis* sp. nov.**

<http://zoobank.org/AF216746-9CBF-45C4-84C9-3A5113AA8A64>

Figs 1D, 8, 12D, 13E, G, 15A

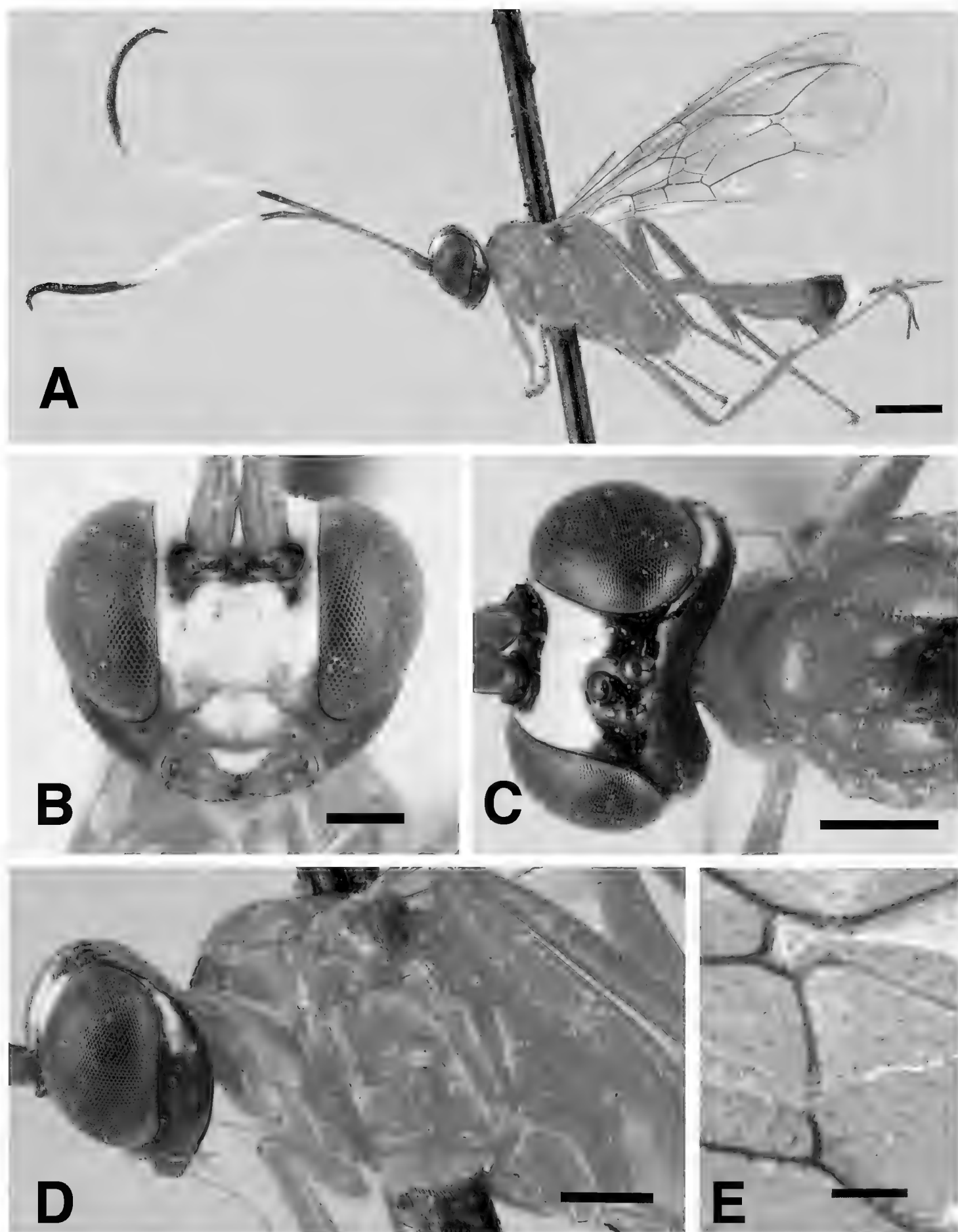
**Diagnosis.** *Piasites perinetensis* sp. nov. can be distinguished from all other *Piasites* species by the combination of the following characters: pronotum mostly smooth and shiny, longitudinally strigose punctate at the dorsal lateral part (Figs 8D, 13E); mesoscutum evenly convex, mostly smooth and shiny (Figs 8C, D, 13E); metapleuron finely transversally striate (Figs 8D, 13G); propodeum strongly rugose, posterior transverse carina very weak without forming lateral crests, merging in the central part with the strong rugosities of the propodeum (Fig. 1D); outer ocular orbit extensively black (Fig. 8D, 13E); propleuron, pronotum, mesoscutum, coxae and T1–3 orange (Figs 8A, D, 13D, E). Additionally, female and male have areolet about 0.60× (Fig. 8E) and 0.45× as high as abscissa of vein 2m-cu above bulla, respectively.

**Description. Female.** Fore wing length about 5.7 mm.

**Head.** In dorsal view, moderately narrowed behind eyes and about 0.58× as long as wide. Gena in dorsal view rounded, strongly swollen. Posterior ocellus separated from eye about 1.6× its maximum diameter. Distance between posterior ocelli 1.2× their diameter. Occipital carina complete, evenly curved dorsally. Face smooth and shiny, slightly convex in the central part with very fine setiferous punctures. Clypeal suture present, deeper laterally. Clypeus about 1.9× as broad as medially long, very convex with relatively long setae in the central part, prominent in lateral view, ventral margin slightly rounded with a median denticle. Malar space about 0.65× as long as basal mandibular width. Mandible 1.50× as long as basal width; dorsal tooth distinctly longer than ventral one. Antenna with 27 flagellomeres, strongly tapered towards apex; flagellomeres from f1 1 to apex conspicuously flattened ventrally; f1 about 7.6× as long as its maximum width.

**Mesosoma.** Pronotum predominantly smooth and shiny, with very weak longitudinal striae at the dorsal lateral part, dorsal margin punctate; epomia moderately





**Figure 8.** *Piasites perinetensis* sp. nov., female (holotype): **A** habitus, lateral view **B** head, front view **C** head and mesoscutum, dorsal view **D** head and mesosoma, lateral view **E** front wing, areolet and vein 2m-cu. Scale bars: 1 mm (**A**); 0.5 mm (**C, D**); 0.3 mm (**B**); 0.2 mm (**E**).

strong and short, not crossing the anterior depression of pronotum. Mesoscutum 1.20× as long as wide, evenly convex, predominantly smooth and shiny, with very fine and dense setiferous punctures on median lobe, lateral parts smooth; notaulus deep,

reaching about 0.5 length of mesoscutum, without transverse keels. Scutellum with very fine setiferous punctures anteriorly, slightly rugulose punctate posteriorly, lateral carinae strong, reaching 0.7 its anterior length. Mesopleuron predominantly smooth and shiny, with very weak and inconspicuous longitudinal striae dorsally; sternaulus deep, with very small transverse carinae; epicnemial carina weak, reaching the anterior margin of mesopleuron at mid length of pronotum. Metapleuron with weak transverse striation, stronger posteriorly, evanescent anteriorly, finely punctate; juxtacoxal and submetapleural carinae strong and complete. Propodeum strongly rugose; anterior transverse carinae complete, centrally angled towards anterior part; posterior transverse carina very weak without forming conspicuous lateral crests, merging in the central part with the strong rugosities of the propodeum. Hind leg with femur about  $6.0\times$  as long as high. Areolet pentagonal, about  $0.80\times$  as high as wide, relatively small,  $0.60\times$  as high as abscissa of vein 2m-cu above bulla. Hind wing with vein cu-a about  $0.35\times$  length of first abscissa of CU.

**Metasoma.** T1 about  $2.3\times$  as long as posteriorly broad, granulate, weakly curved dorsally in lateral view, dorso-lateral carina mostly absent, only present at posterior part of postpetiole. T2 about  $0.97\times$  as long as posteriorly broad, finely granulate as the following tergites. Ovipositor sheath about  $0.55\times$  as long as hind tibia.

**Colour.** Body mostly orange. Head black with face and frons except periphery of antennal sockets, a spot at dorsal part of outer ocular orbit, clypeus, labrum and palpi yellow cream; mandible dark brown; scape, pedicel and f1–3 orange, following flagellomeres dark brown, distal part of f4 to f12, white, f10–12 only dorsally. Mesosoma and legs orange. T1–3 and anterior part of T4 orange, posterior part of T4 and base of T5 brownish black, posterior part of T5 and T6–7 completely white. Wings hyaline, slightly yellowish, pterostigma yellow.

**Male.** Fore wing length about 6.0 mm. **Head.** Posterior ocellus separated from eye about  $1.2\times$  its maximum diameter. Distance between hind ocelli  $1.2\times$  maximum diameter of posterior ocellus. Clypeus about  $1.85\times$  as broad as medially long. Malar space about  $0.5\times$  as long as basal mandibular width. Antenna broken, missing from f13; f1 about  $5.5\times$  long as its maximum width. **Mesosoma.** Pronotum predominantly smooth and shiny, longitudinally strigose punctate at the dorsal lateral part. Areolet about  $0.67\times$  as high as wide,  $0.45\times$  as high as abscissa of vein 2m-cu above bulla. Hind wing with vein cu-a  $0.46\times$  as long as first abscissa of CU. **Metasoma.** T1 about  $3.2\times$  as long as posteriorly broad. T2 about  $1.1\times$  as long as posteriorly broad. **Colour.** As female, but white band of antenna beginning on apex of f7. Metasoma with T5 black with posterior white marks. Other features as in female.

**Etymology.** The species name refers to the type locality, the Andasibe-Mantadia National Park, previously called Perinet Park.

**Material examined.** 1 ♀ 1 ♂. **Holotype:** MADAGASCAR • ♀; Perinet, Forêt Cote Est; Museum Paris; II-39; A Seyrig; MNHN. **Paratype:** MADAGASCAR • 1 ♂; Rogez, Forêt Cote Est; Museum Paris; IV-38; A Seyrig; MNHN.

***Piasites politus* sp. nov.**

<http://zoobank.org/24D0C853-EEC2-4E26-88AA-D6E9EF4C92F0>

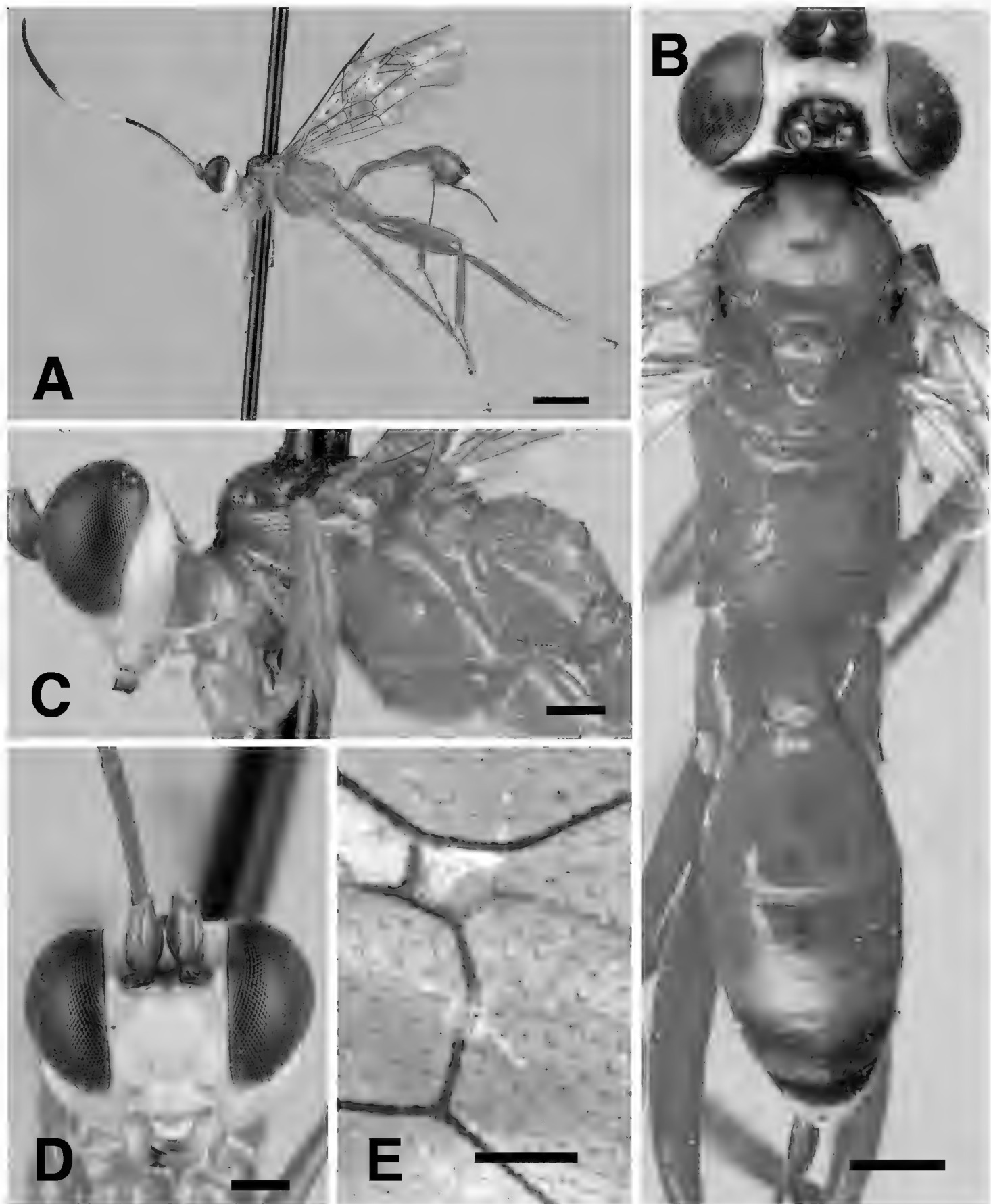
Figs 1C, 9, 15B

**Diagnosis.** *Piasites politus* sp. nov. can be distinguished from all other *Piasites* species by the combination of the following characters: mesoscutum evenly convex, mostly smooth and shiny (Fig. 9B), with very fine punctures on anterior part of median lobe; propodeum from smooth to very shallowly rugulose granulate (Figs 1C, 9B); areolet 0.7–0.9× as high as abscissa of vein 2m-cu above bulla (Fig. 9E).

**Description. Female.** Fore wing length 4.1–5.7 mm.

**Head.** In dorsal view strongly narrowed behind eyes, about 0.55× as long as wide. Gena in dorsal view rounded, moderately swollen. Posterior ocellus separated from eye 1.0–1.2× its maximum diameter. Distance between posterior ocelli 0.75–0.85× their diameter. Occipital carina complete, evenly curved dorsally. Face smooth and shiny, slightly convex in the central part with very fine setiferous punctures. Clypeal suture absent. Clypeus 1.6–1.8× as broad as medially long, moderately convex, with relatively long setae in the central part, somewhat prominent in lateral view, ventral margin rounded with a median denticle. Malar space about 0.75× as long as basal mandibular width. Mandible 1.45× as long as basal width; dorsal tooth distinctly longer than ventral one. Antenna with 27 flagellomeres, strongly tapered towards apex; flagellomeres from f11(13) to apex conspicuously flattened ventrally; f1 about 7.1–7.25× as long as its maximum width.

**Mesosoma.** Pronotum predominantly smooth and shiny, with very weak longitudinal striae at the dorsal lateral part, dorsal margin punctate; epomia strong and short, reaching just the anterior depression of pronotum. Mesoscutum 1.05× as long as wide, evenly convex, predominantly smooth and shiny, with very fine and dense setiferous punctures on anterior part of median lobe, lateral parts completely smooth; middle part without any trace of wrinkles or rugulosities; notaulus very deep anteriorly, reaching about 0.5 length of mesoscutum, without transverse keels. Scutellum smooth and shiny, lateral carinae strong, reaching posterior rim. Mesopleuron predominantly smooth and shiny, with very weak and inconspicuous longitudinal striae dorsally, anterior part with shallow and fine punctures; sternaulus very deep and narrow, with very weak and inconspicuous transverse keels; epicnemial carina moderately strong, reaching the subtegular ridge. Metapleuron smooth and shiny; juxtacoxal carina weak, fading posteriorly; submetapleural carina strong and complete. Propodeum smooth to very shallowly rugulose granulate; anterior transverse carina complete, centrally angled towards anterior part; posterior transverse carina strong and complete without forming conspicuous lateral crests, central part curved, tending to be subparallel to anterior transverse carina. Hind leg with femur 5.3–6.2× as long as high. Areolet pentagonal, 0.7–0.8× as high as wide, relatively small, 0.7–0.9× as high as abscissa of vein 2m-cu above bulla. Hind wing with vein cu-a about 0.5× length of first abscissa of CU.



**Figure 9.** *Piasites politus* sp. nov., female: **A** habitus, lateral view (holotype) **B** head, mesosoma and metasoma, dorsal view (paratype) **C** head and mesosoma, lateral view (holotype) **D** head, front view (holotype) **E** front wing, areolet and vein 2m-cu (paratype). Scale bars: 2 mm (**A**); 0.5 mm (**B**, **C**); 0.3 mm (**D**); 0.2 mm (**E**).

**Metasoma.** T1 2.35–2.5× as long as posteriorly broad, shallowly and finely granulate, moderately curved dorsally in lateral view, dorso-lateral carina complete, something faded around the spiracle. T2 0.9–0.95× as long as posteriorly broad, shallowly and finely granulate as the following tergites. Ovipositor sheath 0.5–0.65× as long as hind tibia.

**Colour.** Body mostly orange. Head yellow cream; mandibular teeth, ocellar triangle and central part of occiput dark brown; scape, pedicel and f1–3 orange, following



flagellomeres dark brown, distal part of f4(5) to f10(12), white, f10–12 only dorsally. Mesoscutum dark orange. T5 black dorsally, T6–7 yellow cream. Wings hyaline, slightly yellowish, pterostigma yellow.

**Male.** Unknown.

**Etymology.** From the Latin *politus*, meaning “polished”, in reference to the mostly smooth and shiny surface of the body, particularly the mesoscutum and propodeum.

**Material examined.** 4 ♀♀. Holotype: MADAGASCAR • ♀; Perinet, Forêt Cote Est; Museum Paris; II-39; A Seyrig; MNHN. **Paratypes:** MADAGASCAR • 1 ♀; Fianarantsoa, Plateau Central; III-38; A. Seyrig • 1 ♀; Perinet, Forêt Cote Est; Museum Paris; II-39; A Seyrig • 1 ♀, Rogez, Forêt Cote Est; Museum Paris; IV-37; A Seyrig (all them MNHN).

***Piasites quasimodus* sp. nov.**

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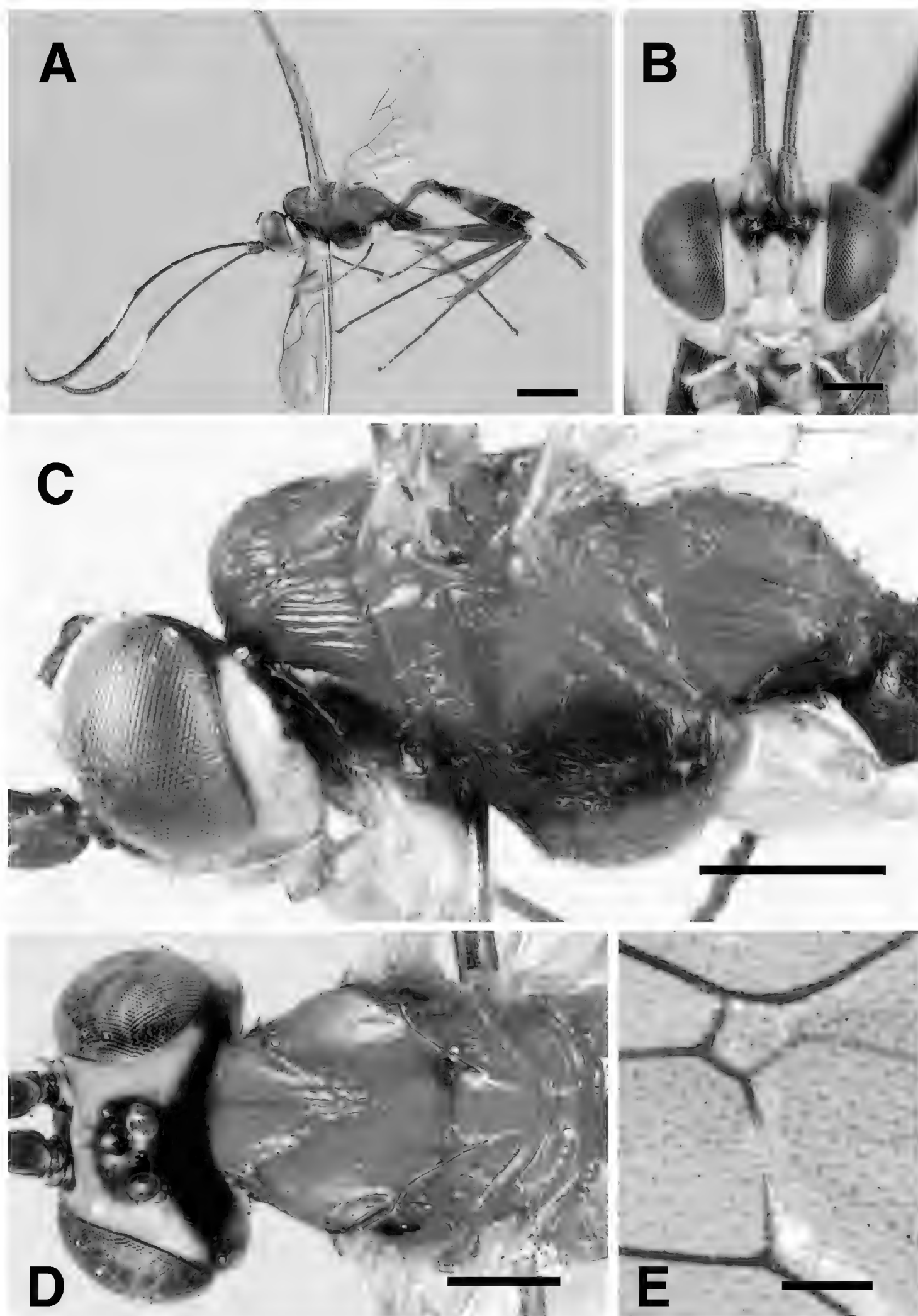
Figs 1B, 10, 12B, 13B, 15C

**Diagnosis.** *Piasites quasimodus* sp. nov. can be easily distinguished from all other *Piasites* species by the occipital carina dorsally absent and the mesoscutum with very convex and prominent median lobe, mostly smooth with fine punctures on median lobe (Figs 10C, D, 13B). Additionally, female and male have areolet 1.55–1.7× and 1.3× as high as abscissa of vein 2m-cu above bulla, respectively (Fig. 10E).

**Description. Female.** Fore wing length 3.8–5.5 mm.

**Head.** In dorsal view, moderately narrowed behind eyes, 0.5–0.55× as long as wide. Gena in dorsal view rounded, moderately swollen. Posterior ocellus separated from eye 1.15–1.25× its maximum diameter. Distance between posterior ocelli 0.8–1.0× their diameter. Occipital carina absent dorsally, weakly present laterally above base of mandible. Face smooth and shiny, convex in the central part, with very few and fine setiferous punctures. Clypeal suture absent. Clypeus 1.75–1.90× as broad as medially long, very convex, with few and relatively long setae in the central part, prominent in lateral view, ventral margin sharp and rounded, without a median denticle. Malar space 0.60–0.65× as long as basal mandibular width. Mandible 1.65× as long as basal width; dorsal tooth distinctly longer than ventral one. Antenna with 23–25 flagellomeres, strongly tapered towards apex; flagellomeres from f11 to apex conspicuously flattened ventrally; f1 7.00–7.25× as long as its maximum width.

**Mesosoma.** Pronotum smooth and shiny, with coarse longitudinal striae at the dorsal lateral part, parallel to the dorsal margin; epomia moderately strong and very short. Mesoscutum 1.10× as long as wide, with very convex and prominent median lobe, predominantly smooth with very fine and dense setiferous punctures on median lobe, lateral parts smooth; middle part with posteriorly convergent strigosity; notaulus very deep and wide anteriorly, reaching about 0.5 length of mesoscutum, anterior part with coarse and strong transverse keels, which are parallel to the pronotum striae. Scutellum smooth with very fine inconspicuous setiferous punctures, lateral carinae strong, reaching 0.8 its anterior length. Mesopleuron shiny, with longitudinal striae



**Figure 10.** *Piasites quasimodus* sp. nov., female: **A** habitus, lateral view (holotype) **B** head, front view (paratype) **C** head and mesosoma, lateral view (holotype) **D** head and mesoscutum dorsal view (paratype); **E** front wing, areolet and vein 2m-cu (paratype). Scale bars: 1 mm (**A**); 0.5 mm (**C**); 0.3 mm (**B**, **D**); 0.2 mm (**E**).

dorsally, densely punctate ventrally, less dense posteriorly; sternaulus deep, with small transverse carinae; epicnemial carina weak, reaching the anterior margin of mesopleuron at mid length of pronotum. Metapleuron predominantly smooth and shiny, with very weak and transverse inconspicuous striation; juxtacoxal and submetapleural carinae strong and complete. Propodeum predominantly smooth and shiny, with very fine and sparse setiferous punctures; transverse carinae complete, anterior one centrally angled towards anterior part, posterior one straight, without lateral elevations. Hind leg with femur 5.5–5.8× as long as high. Areolet pentagonal, 0.65–0.80× as high as wide, relatively big, 1.55–1.70× as high as abscissa of vein 2m-cu above bulla. Hind wing with vein cu-a 0.45–0.60× length of first abscissa of CU.

**Metasoma.** T1 2.1–2.3× as long as posteriorly broad, weakly granulate at base, posteriorly smooth, weakly curved dorsally in lateral view, dorso-lateral carina very weak, somewhat erased in mid part. T2 0.85–1.00× as long as posteriorly broad, smooth and shiny as the following tergites. Ovipositor sheath 0.45–0.60× as long as hind tibia.

**Colour.** Body mostly orange. Head black with clypeus, labrum, malar space, mandible except theeth, palpi, face, frons except periphery of antennal sockets and stemmatium, vertical orbits, and ventral 3/4 of outer ocular orbits, yellow cream; antenna dark brown, distal part of f6 to f9(10) dorsally yellow cream. Mesosoma orange, ventrally tending to be infusate to dark brown. Tegula basally white, distally hyaline. T1 yellow, T2 anteriorly dark brown, yellow posteriorly; T3 yellow, T4 brownish black, T6 and T7 white. Front leg predominantly yellow cream, dorsal part of tibia and tarsus infusate. Mid leg with coxa, trocanter and trochantellus yellow cream; femur, tibia and tarsus light brown. Hind leg with coxa dark brown, trochanter yellow cream, femur tibia and tarsus light brown to brown. Wings hyaline, pterostigma yellow.

**Male.** Fore wing length 4.0–4.4 mm. **Head.** Dorsal part of gena almost flat. Posterior ocellus separated from eye 1.0–1.1× its maximum diameter. Distance between hind ocelli 0.8–1.1× maximum diameter of posterior ocellus. Clypeus about 1.75× as broad as medially long. Malar space 0.55–0.60× as long as basal mandibular width. Antenna with 24–25 flagellomeres, flagellum distinctly enlarged subapically; flagellomeres from f13(14) to apex flattened ventrally; f1 7.5–7.7× as long as wide. **Mesosoma.** Metapleuron predominantly smooth and shiny, with sparse setiferous punctures dorsally, somewhat weakly granulate ventrally. Hind leg with femur 5.7–5.8× as long as high. Areolet about 0.9× as high as wide; 1.3× as high as abscissa of vein 2m-cu above bulla. Hind wing with vein cu-a about 0.4× length of first abscissa of CU. **Metasoma.** T1 2.5–2.6× as long as posteriorly broad. T2 1.2–1.3× as long as posteriorly broad. **Colour.** As in female, but sometimes apex of scutellum and postscutellum yellow. Flagellum with distal part of f9 to f12(13) dorsally white. Other features as in female.

**Etymology.** This name is a free latinized adaptation of the name of the character Quasimodo, the “hunchback” from the novel “Notre-Dame de Paris” (1831) by Victor Hugo. The name is a reference to the clearly projected median lobe of the mesoscutum in this species, while in all other species the mesoscutum is uniformly convex.

**Material examined.** 13 ♀♀ 6 ♂♂. **Holotype:** MADAGASCAR • ♀; Bekily, Reg sud de L’île; Museum Paris; X-36; A. Seyrig; MNHN. **Paratypes:** MADAGASCAR • 2♀♀;

Ambohimanga; Museum Paris; XI-36; A. Seyrig • 1♀; Ambositra; Museum Paris; III-38; A. Seyrig • 1♀; same data as for preceding; II-39 • 1♀; Ankaratra; alt 1800; II-38; Mus. Paris; A. Seyrig • 1♀; same data as for preceding; III-40 • 2♀♀; Bekily, Reg sud de L'ile; Museum Paris; V-36; A. Seyrig • 1♀, 1♂; same data as for preceding; X-36 • 1♀, 1♂; same data as for preceding; V-37 • 1♀; same data as for preceding; XI-38 • 2♂♂; same data as for preceding; VI-40 • 1♂; same data as for preceding; X-40 • 1♀, 1♂; Fianarantsoa, Plateau central; Museum Paris; XI-36; A. Seyrig (all them MNHN).

***Piasites seyrigi* sp. nov.**

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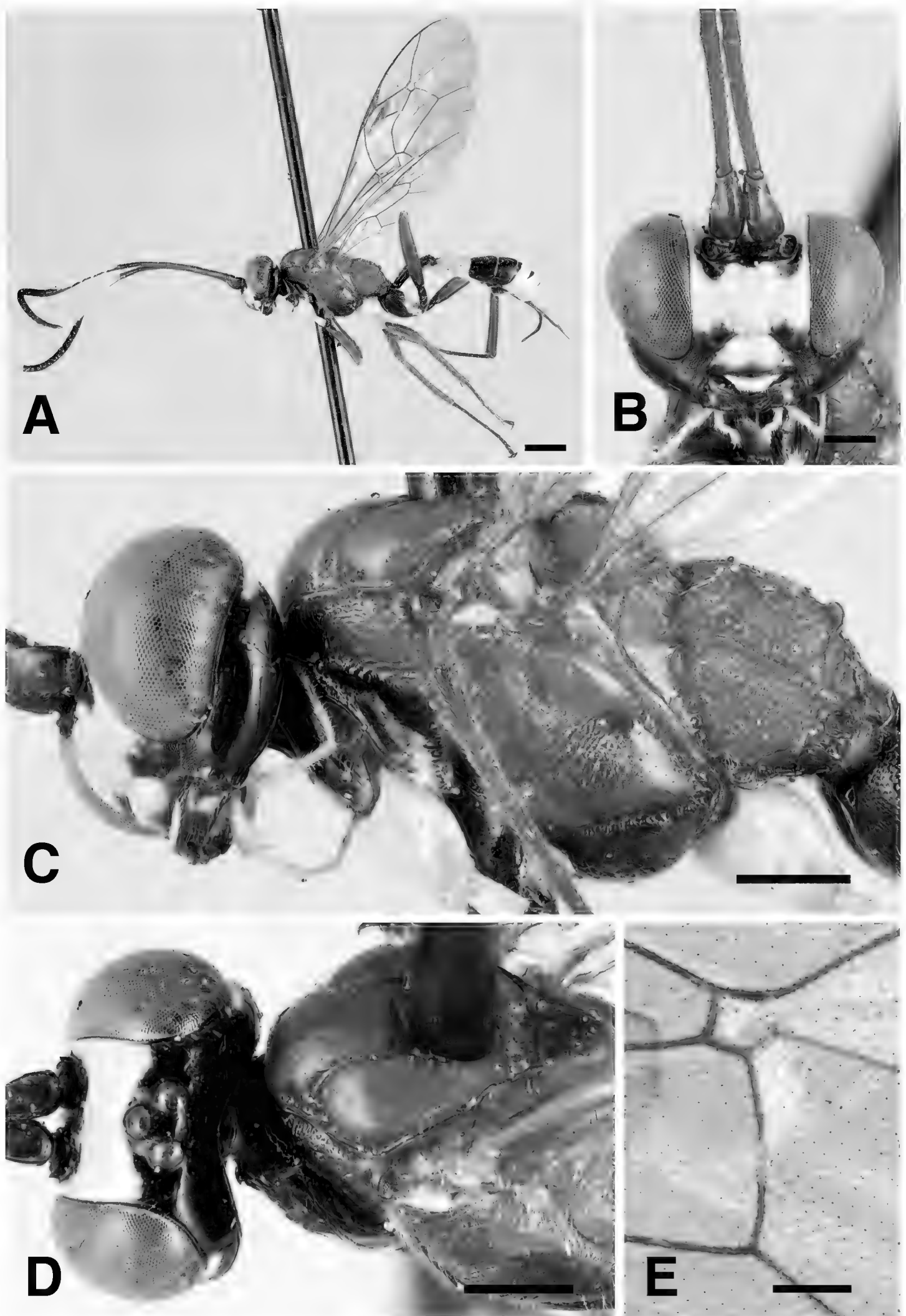
Figs 2D, 11, 12C, 13C, 15D

**Diagnosis.** *Piasites seyrigi* sp. nov. can be distinguished from all other *Piasites* species by the combination of the following characters: mesoscutum evenly convex, mostly smooth and shiny, with very fine punctures on anterior part of median lobe (Figs 11C, D, 13C); metapleuron transversely strigose punctate (Figs 11C, 13C); juxtacoxal carina strong and complete (Figs 11C, 13C); propodeum strongly rugose; posterior transverse carina forming conspicuous lateral crests in female (Figs 2D, 11C), lower in male (Fig. 13C); areolet 0.6–0.7× as high as abscissa of vein 2m-cu above bulla (Fig. 11E); front and mid coxae yellow cream, hind coxa black and yellow cream (Figs 11A, 12C) without longitudinal yellow cream stripe at base; T1 and T3 black, T2 yellow cream (Figs 11A 12C). Additionally, male has pronotum and mesopleuron mostly smooth and shiny, shallowly strigose punctate dorsally; mesopleuron with shallow rugae close to mesopleural fovea (Fig. 13C).

**Description. Female.** Fore wing length 6.0–7.0 mm.

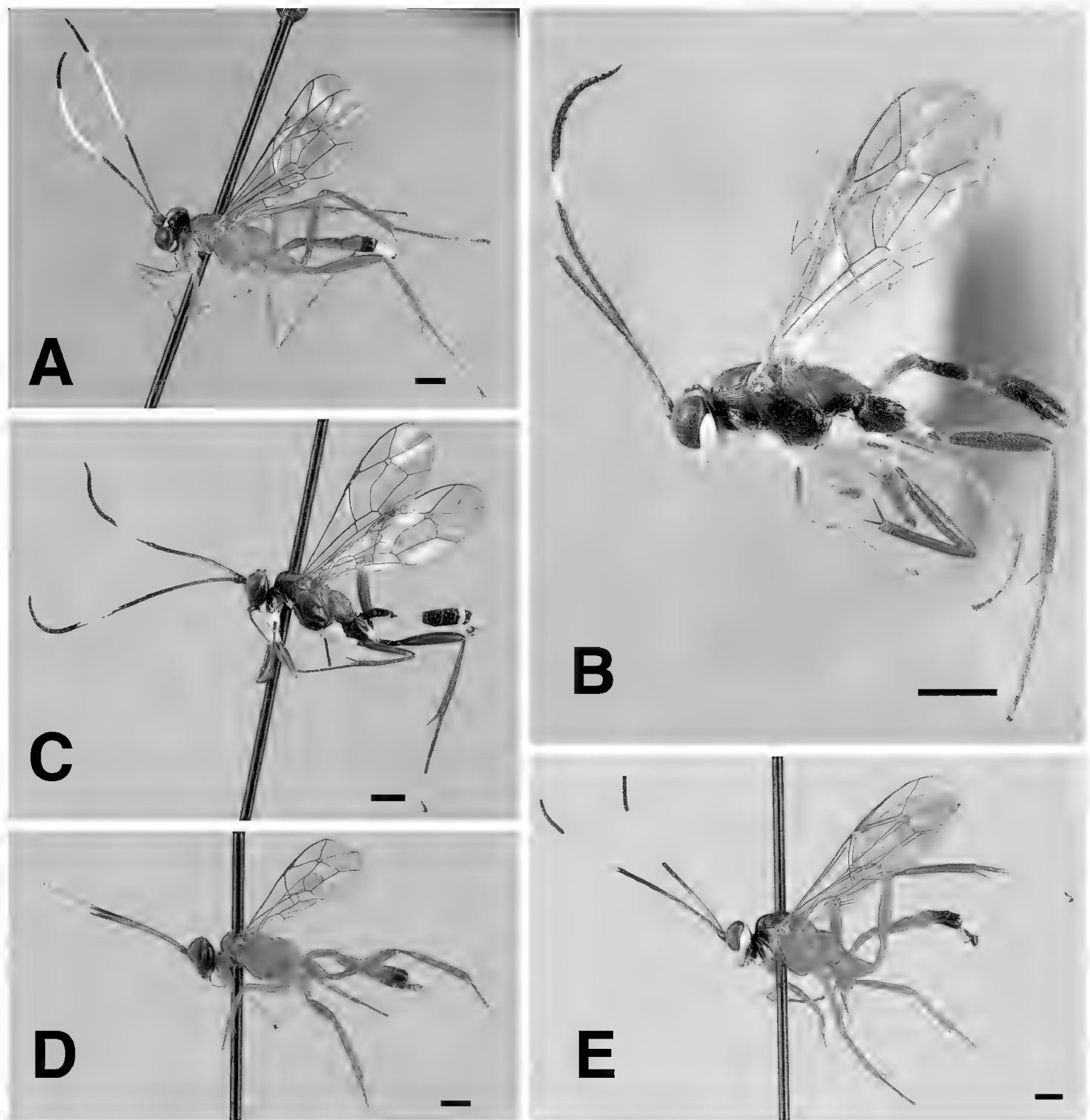
**Head.** In dorsal view, strongly narrowed behind eyes about 0.55 as long as wide. Gena in dorsal view rounded, slightly swollen. Posterior ocellus separated from eye 1.25–1.35× its maximum diameter. Distance between posterior ocelli 1.0–1.2× their diameter. Occipital carina complete, evenly curved in dorsal view. Face mostly smooth and shiny, slightly convex in the central part, with very fine setiferous punctures. Clypeal suture present laterally. Clypeus 1.80–1.95× as broad as medially long, very convex, with relatively long setae in the central part, prominent in lateral view, ventral margin slightly rounded, almost truncate, with a weak median denticle. Malar space 0.6–0.7× as long as basal mandibular width. Mandible 1.55× as long as basal width; dorsal tooth distinctly longer than ventral one. Antenna with 29 flagellomeres, strongly tapered towards apex; flagellomeres from f10(11) to apex conspicuously flattened ventrally; f1 7.0–7.5× as long as its maximum width.

**Mesosoma.** Pronotum longitudinally strigose punctate posteriorly to anterior depression, stronger dorsally and ventrally; epomia moderately strong, short, reaching just the anterior depression of pronotum. Mesoscutum about 1.05× as long as wide, evenly convex, predominantly smooth and shiny, with very fine and dense setiferous punctures on anterior part of median lobe, very sparse on anterior part of lateral lobes; middle part with weak rugosities between posterior end of notauli; notaulus deep,



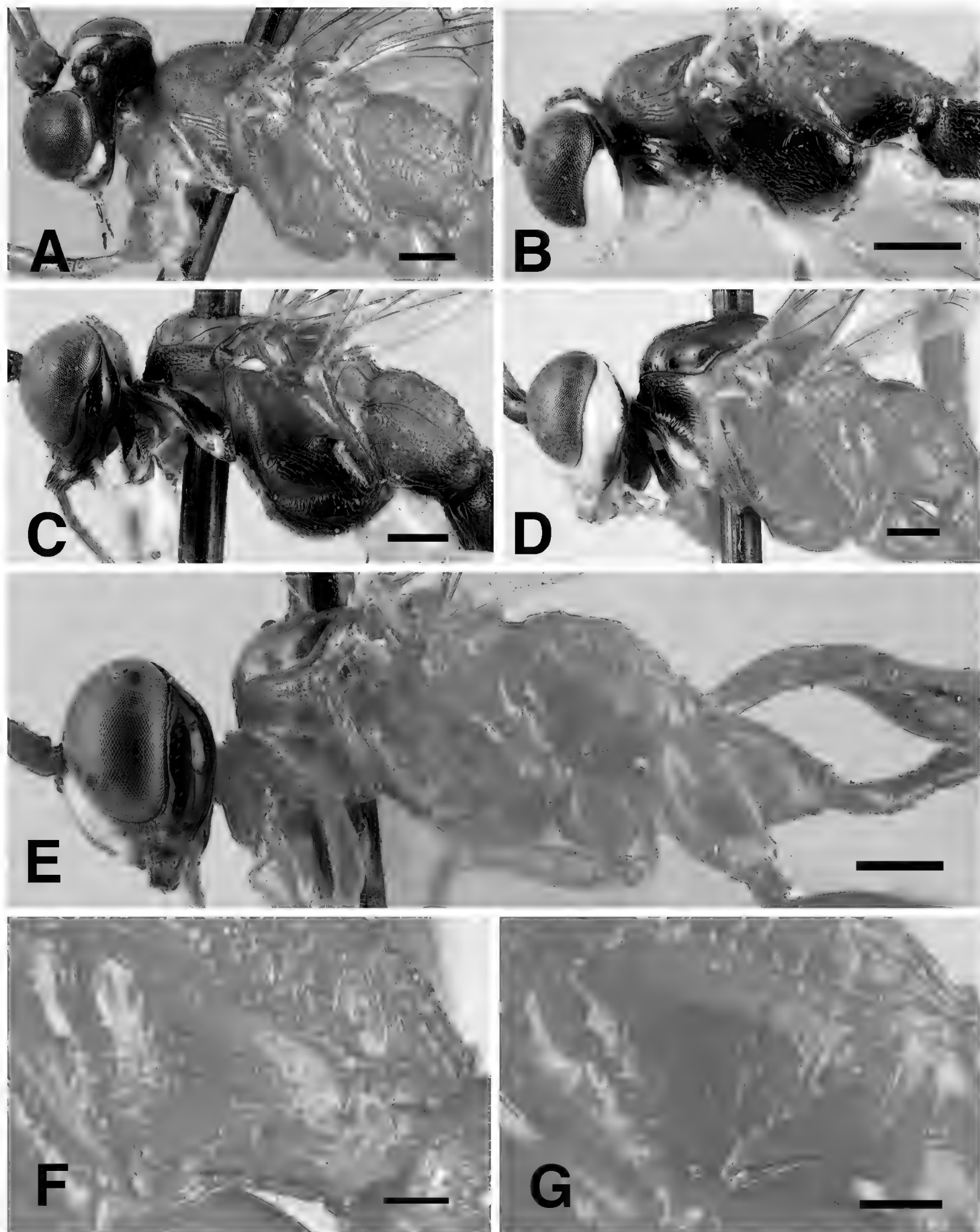
**Figure 11.** *Piasites seyrigi* sp. nov., female: **A** habitus, lateral view (holotype) **B** head, front view (holotype) **C** head and mesosoma, lateral view (holotype) **D** head and mesoscutum dorsal view (holotype) **E** front wing, areolet and vein 2m-cu (paratype). Scale bars: 1 mm (**A**); 0.5 mm (**C**, **D**); 0.3 mm (**B**, **E**).





**Figure 12.** *Piasites* species, habitus of males, lateral view: **A** *P. carinatus* **B** *P. quasimodus* sp. nov. (paratype) **C** *P. seyrigi* sp. nov. (paratype) **D** *P. perinetensis* sp. nov. (paratype) **E** *P. nigricollis* sp. nov. (paratype). Scale bars: 1 mm.

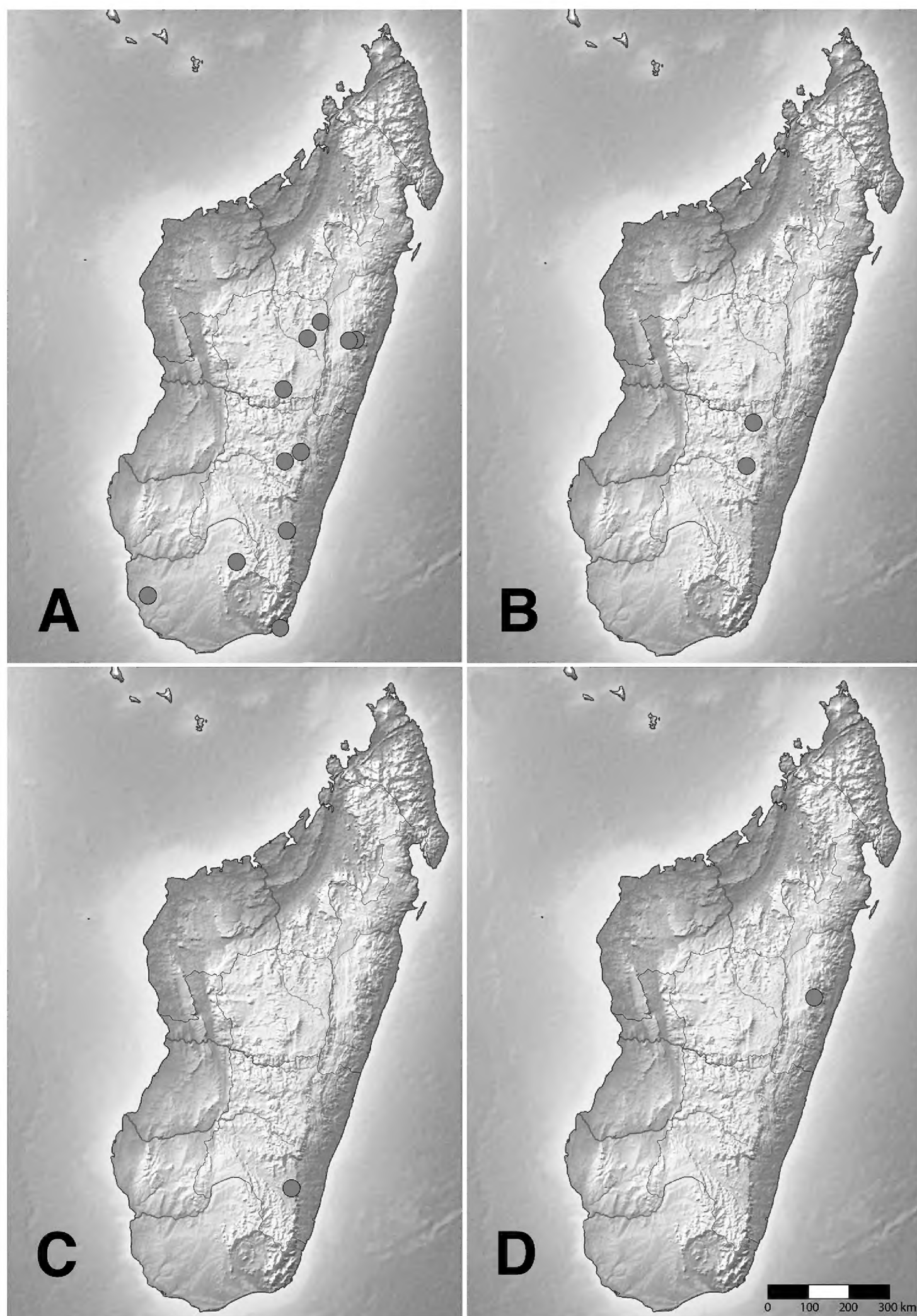
reaching about 0.7 length of mesoscutum, without transverse keels. Scutellum with coarse and sparse punctures anteriorly, lateral carinae strong, reaching 0.7 its length. Mesopleuron finely longitudinally strigose punctate and striate punctate on a smooth background, sternaulus deep and wide, with very strong transverse keels; epicnemial carina relatively strong, reaching the subtegular ridge. Metapleuron with transverse strong striation, coarse and stronger posteriorly, weaker anteriorly, finely punctate; juxtacoxal and submetapleural carinae very strong and complete. Propodeum strongly rugose; anterior transverse carina complete, centrally distinctly curved towards anterior part; posterior transverse carina strong and complete, forming conspicuous lateral crests, central part widely curved, tending to be subparallel to anterior transverse carina. Hind leg with femur 5.8–5.9× as long as high. Areolet pentagonal, 0.7–0.8× as



**Figure 13.** *Piasites* species, males **A–E** head and mesosoma, lateral view: **A** *P. carinatus* **B** *P. quasimodus* sp. nov. (paratype) **C** *P. seyrigi* sp. nov. (paratype) **D** *P. nigricollis* sp. nov. (paratype) **E** *P. perinetensis* sp. nov. (paratype) **F–G** metapleuron: **F** *P. nigricollis* sp. nov. (paratype) **G** *P. perinetensis* sp. nov. (paratype). Scale bars: 0.5 mm (**A–E**); 0.2 mm (**F, G**).

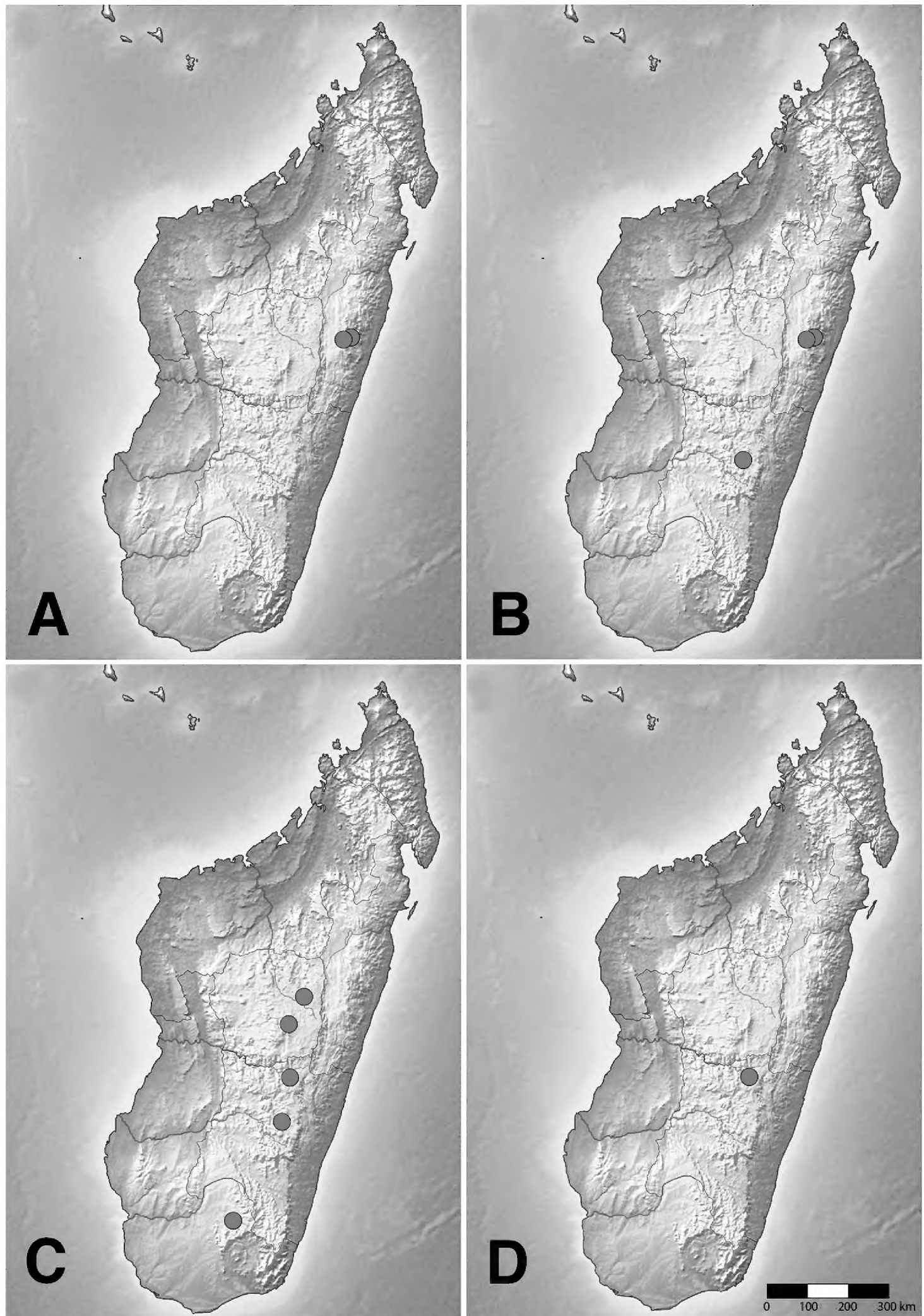
high as wide, relatively small,  $0.6\text{--}0.7\times$  as high as abscissa of vein 2m-cu above bulla. Hind wing with vein cu-a  $0.6\text{--}0.62\times$  length of first abscissa of CU.

**Metasoma.** T1  $2.55\text{--}2.6\times$  as long as posteriorly broad, granulate, weakly curved dorsally in lateral view, dorso-lateral carina weak but complete. T2  $0.8\text{--}0.9\times$  as long



**Figure 14.** Diagrams showing distribution records for species of *Piasites* **A** *P. carinatus* **B** *P. lineatus* sp. nov. **C** *P. nigricollis* sp. nov. **D** *P. orbitalis* sp. nov.





**Figure 15.** Diagrams showing distribution records for species of *Piasites* **A** *P. perinetensis* sp. nov. **B** *P. politus* sp. nov. **C** *P. quasimodus* sp. nov. **D** *P. seyrigi* sp. nov.

as posteriorly broad, finely granulate as the following tergites. Ovipositor sheath 0.6–0.7× as long as hind tibia.

**Colour.** Body orange, black and yellow cream. Head predominantly black with face and frons (except periphery of antennal sockets), a spot at dorsal part of outer ocular orbit, clypeus centrally, labrum, base of mandible and palpi, yellow cream; scape, pedicel and f1–3 dark orange to brown, following flagellomeres blackish brown, f5–9(10) white. Mesosoma dark orange, anterior part of pronotum and propleuron, mesosternum and metasternum dark brown; subtegular ridge and a subventral spot on pronotum yellow cream. T1, T3–4 black, T2 yellow cream, T5–8 mostly yellow cream, anteriorly black. Legs predominantly orange; front and mid coxae and tranchanters white cream; hind coxa black with dorsal apical 0.5 yellow cream, hind trochanter and trochantellus black. Wings hyaline, slightly yellowish, pterostigma light brown.

**Male.** Fore wing length about 6.7 mm. **Head.** Posterior ocellus separated from eye about 1.4× its maximum diameter. Distance between hind ocelli about once maximum diameter of posterior ocellus. Clypeus about 1.9× as broad as medially long. Malar space about 0.58× as long as basal mandibular width. Antenna with 29 flagellomeres; flagellum only slightly enlarged subapically; flagellomeres from f14(15) to apex flattened ventrally; f1 about 6.0× long as its maximum width. **Mesosoma.** Pronotum mostly smooth and shiny, shallowly strigose punctate dorsally. Mesopleuron shallowly strigose punctate dorsally and centrally close to mesopleural fovea, elsewhere smooth and shiny; sternaulus with weak transverse keels. Metapleuron transversely strigose punctate. Posterior transverse carina forming low lateral crests. Areolet about 0.67× as high as wide, about 0.7× as high as abscissa of vein 2m-cu above bulla. Hind wing with vein cu-a 0.64× as long as first abscissa of CU. **Metasoma.** T1 about 3.0× as long as posteriorly broad. T2 about 1.15× as long as posteriorly broad. **Colour.** As female, antenna broken, white band from f8 to f14. Other features as in female.

**Etymology.** This species is named after entomologist André Seyrig, who described *Piasites* and provided a pioneering and thorough taxonomic assessment of the cryptine fauna of Madagascar.

**Material examined.** 5 ♀♀ 2 ♂♂. **Holotype:** MADAGASCAR • ♀; Ambositra; Museum Paris; XI-36; A. Seyrig; MNHN. **Paratypes:** MADAGASCAR • 1 ♀; same collection data as for holotype • 2 ♀♀, 1 ♂; same data as for preceding; III-38 • 1 ♀; same data as for preceding; II-39 (all them MNHN). **Other material.** MADAGASCAR • 1 ♂; Ambositra; Museum Paris; III-38; A. Seyrig; MNHN. This specimen has the vein cu-a+first abscissa of CU of hind wing straight without any interception by second abscissa of CU, which is vestigial at some distance.

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